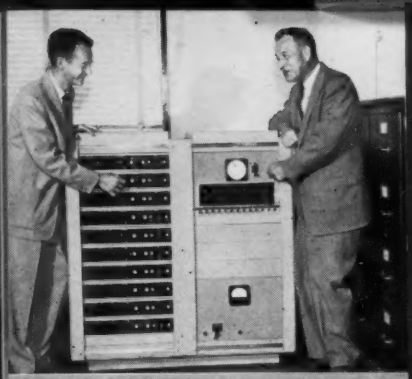

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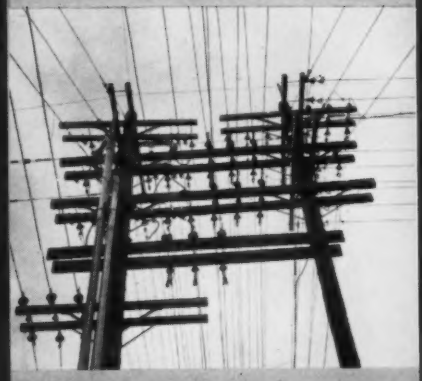

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ELECTRICAL WEST

December 1956
25 Cents

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

Outdoor lighting on Denver homes says "Merry Christmas" to the West

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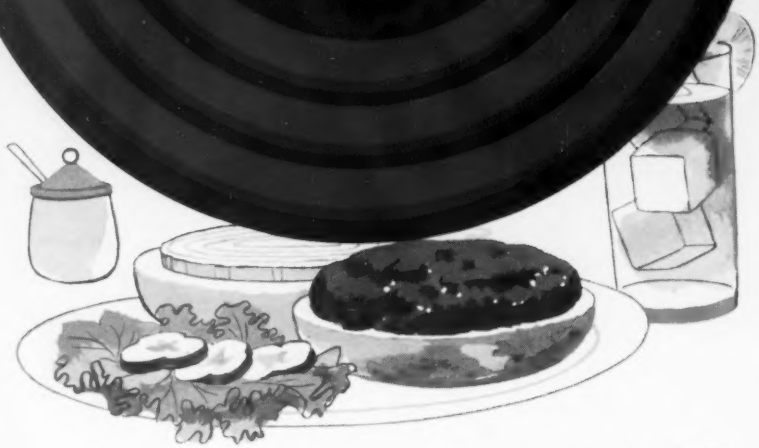
Edison
is demonstrating
the speed of
electric cooking...
to speed up
your
electric range
sales

Electric cooking is fastest!



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Hamburgers
"deliciously done"
in 2½ minutes—
when you
cook
electrically!

TODAY NOTHING COOKS FASTER than a modern electric range. From a cold start with a cold pan, hamburgers are ready to eat in 2½ minutes. Hot soup takes 68 seconds. Bacon and eggs 3½ minutes. Fry, bake, broil or roast – electricity does it better.

▶ THERE'S MORE: your kitchen is cooler. And cleaner. Pots and pans stay mirror-bright. Kitchen walls look fresh and new much longer.

▶ AFTER THE WARRANTY on your range expires, Edison services it *free* – charges only for parts, if needed.

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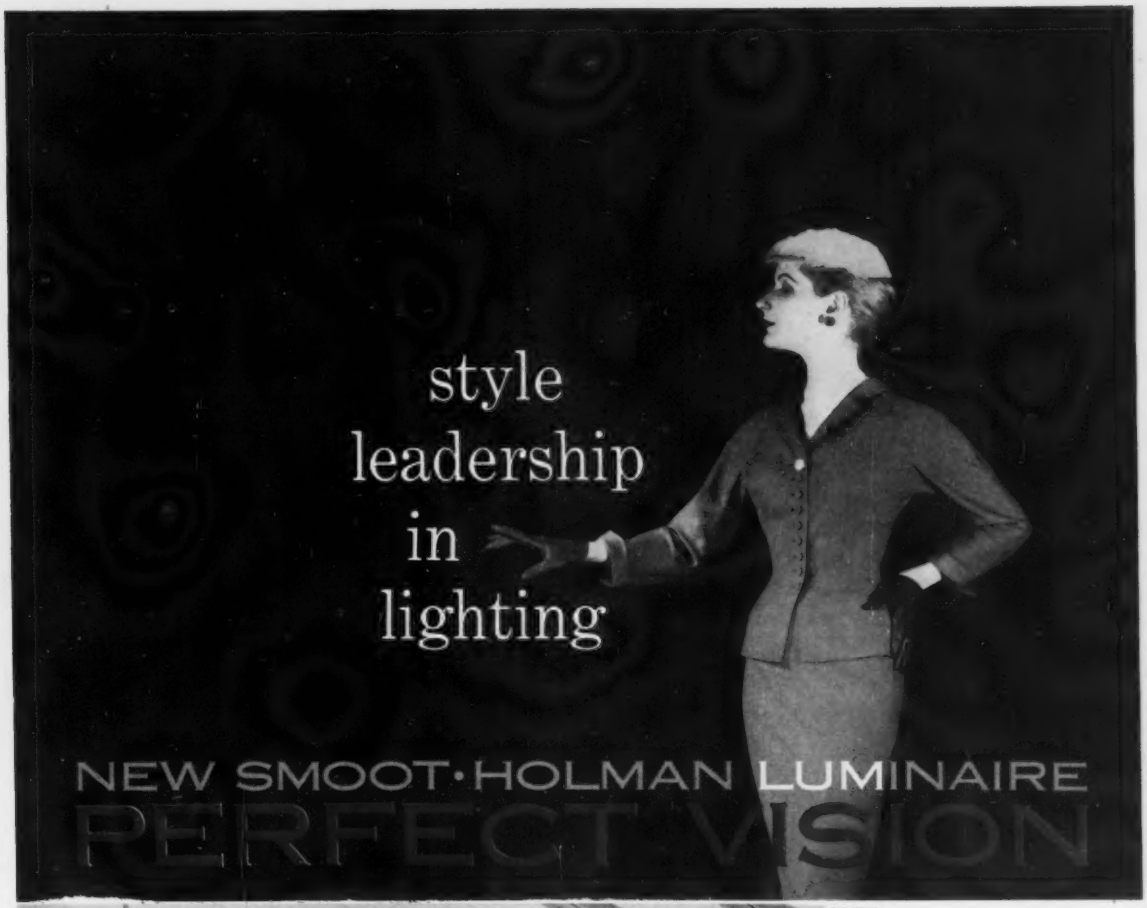

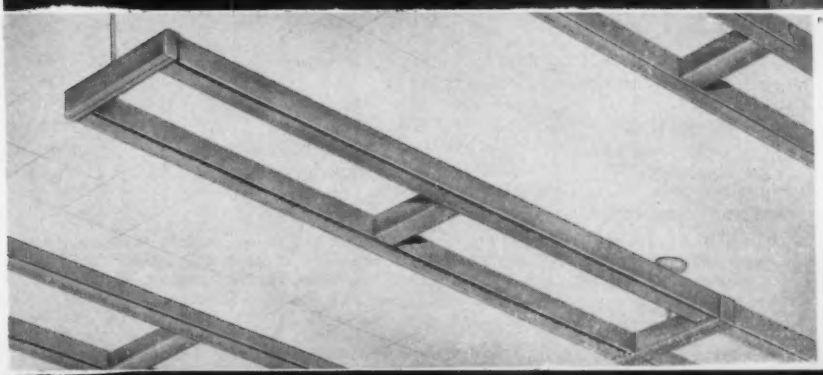

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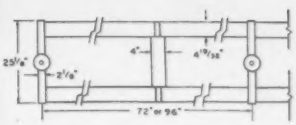

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Investigate the many advantages of this excitingly new, architecturally beautiful luminaire. Contact your local Smoot-Holman office or write direct for Catalog PV-288.

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SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

THE ALL-INDUSTRY MAGAZINE OF PROGRESS, ESTABLISHED 1887,
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Contents copyright. Seventieth year of publication.

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Next Month

January, the Industrial Development issue, will present a picture of what the electrical industry may expect during the coming year. We plan to forecast the business climate for 1957 and to have a round-up of Western promotional plans. Informed people in the eleven Western states will be asked to give their opinions of the year to come, to tell their plans for industry development.

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ELECTRICAL WEST (with which is consolidated The Journal of Electricity), DECEMBER 1956. Vol. 117, No. 6. Published monthly by McGraw-Hill Company of California. **Executive, Editorial and Advertising Offices: 68 Post St., San Francisco 4, Calif.** Publication office: 1125 W. Sixth St., Los Angeles 17, Calif. James H. McGraw (1860-1948), Founder; Donald C. McGraw, Chairman of the Board; George C. Tenney, President; John W. Otterson, Vice-President; B. M. Boccoli, Secretary and Treasurer. **Subscriptions: Address correspondence to Electrical West—Subscription Service, 68 Post St., San Francisco 4, Calif. Allow 30 days for change of address. Please indicate position and company connection on all subscription orders.** Single copies 25c (November Issue 50c). Subscription rates—U. S. possessions and Latin American Republics: $2 a year; $3 for two years; $4 for three years. Canada $2.50 a year; $5 for three years. All other countries $3 a year; $5 for two years; $6 for three years. Entered as second class matter April 17, 1947, at the post office at Los Angeles, Calif., under the act of March 3, 1879. Printed in U. S. A.

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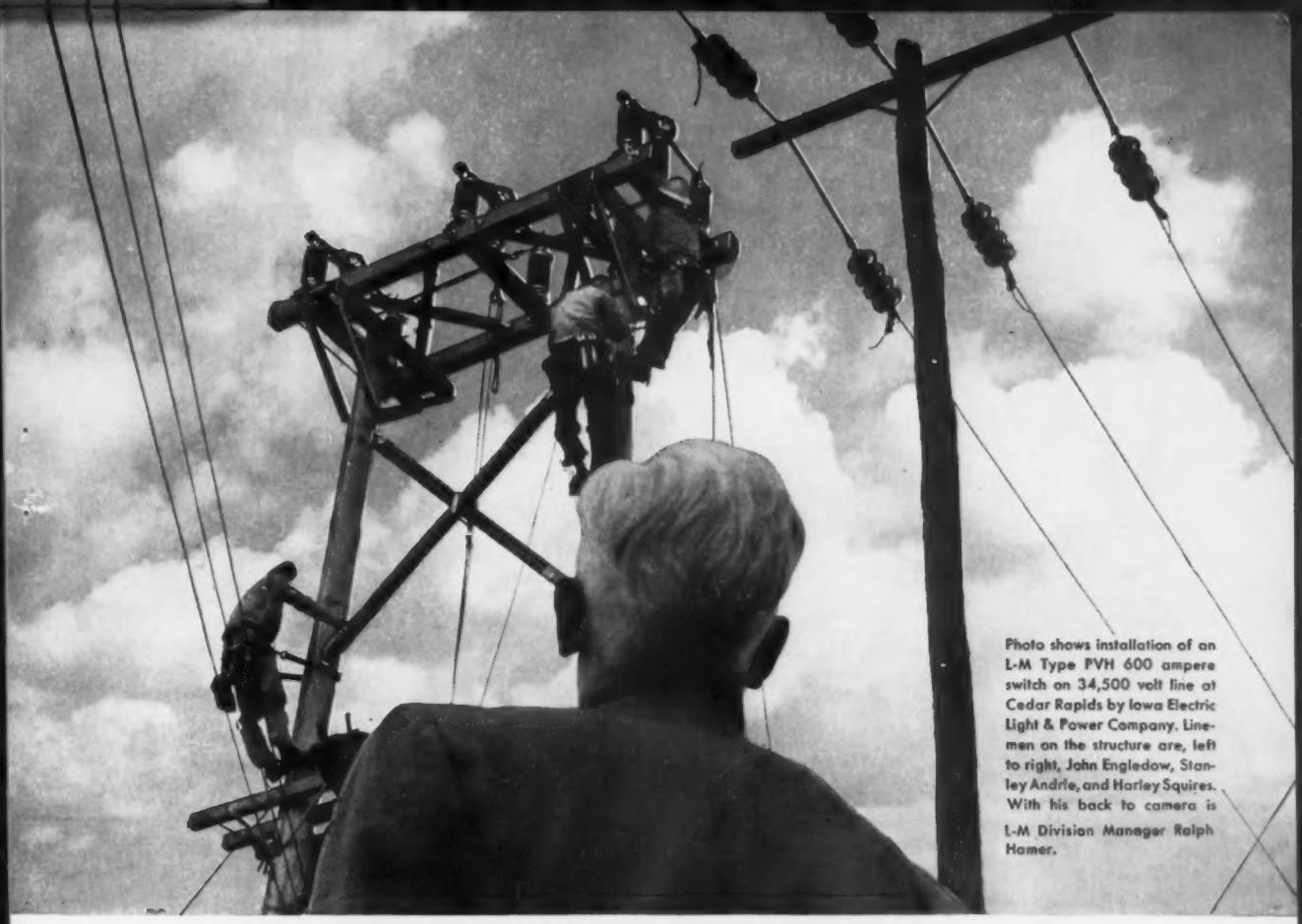


Photo shows installation of an L-M Type PVH 600 ampere switch on 34,500 volt line at Cedar Rapids by Iowa Electric Light & Power Company. Linemen on the structure are, left to right, John Engledow, Stanley Andrle, and Harley Squires. With his back to camera is L-M Division Manager Ralph Hamer.

Iowa EL&P Installs L-M PVH Switches To Cut Sparkovers on Lightning Surges

by
HOWARD K. HOLLINGSHEAD
Division Manager
Iowa Electric Light
& Power Company

The photograph shows the installation of an L-M type PVH air break switch on our lines at Cedar Rapids. The new switch replaced an older switch on a point in the lines that is operated "normally open."

The former switch operated satisfactorily as a normally closed switch, but on normally open service the inadequate clearance caused line tripouts and switch insulator damage caused by lightning surges during thunderstorms. During the summer of 1954, eight of the nine insulators on the old switch were damaged.

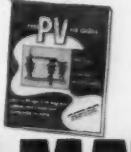
We expect that the new PVH switch has ample clearance and thus will eliminate the trouble. As additional assurance against surges piling up and spilling over, arresters have been installed on each side of the switch one span away.

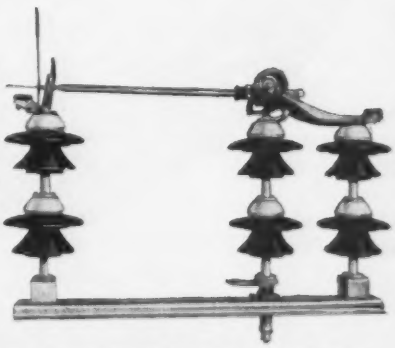
Since it was not practicable to de-energize the circuits joined at this point during installation time, they were dead-ended temporarily on the single pole shown at the right of the photograph, while the switch is being installed on existing poles.

The new L-M switch is being installed under the supervision of Crew Foreman Howard Norris. He and all the members of the crew were particularly pleased by the rugged simplicity of the PVH switch and the ease of assembly and adjustment. He particularly liked the identification of the interphase bars and the foolproof method of installing them.

Get This Bulletin For Complete Information

L-M offers a complete line of vertical air break and hook switches through 1200 amperes and 69 kv. For information and bulletin ask the L-M Field Engineer; or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).





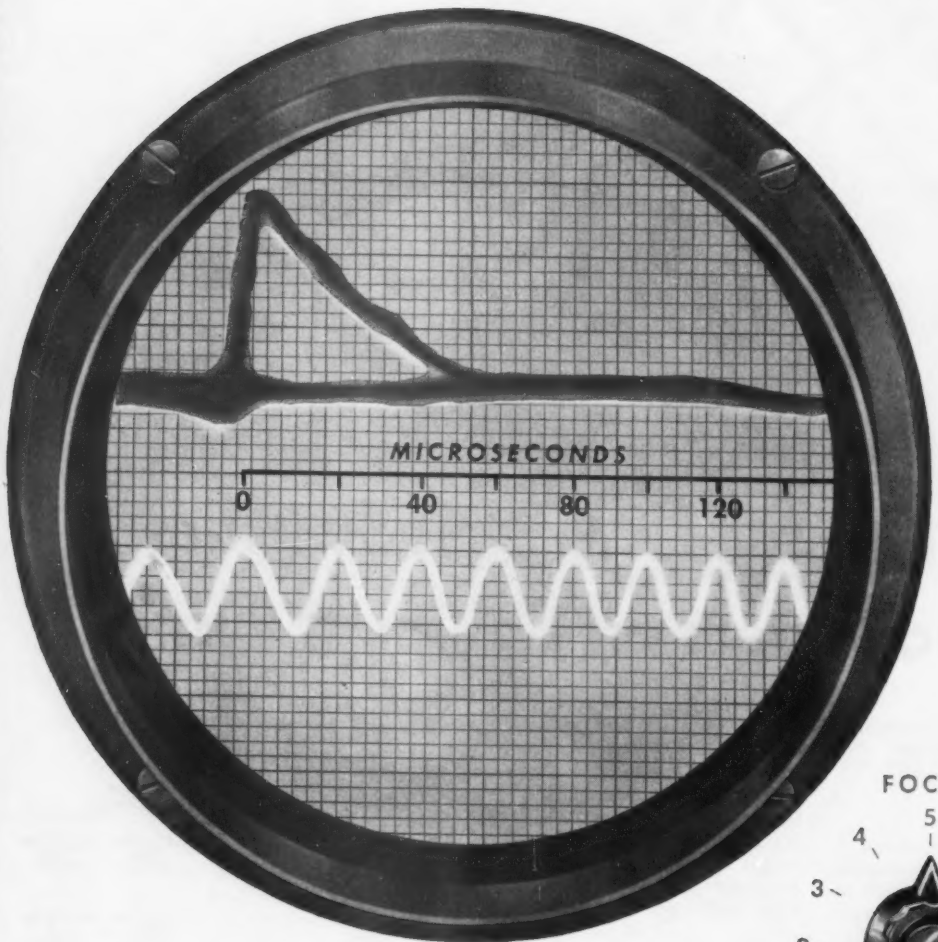
L-M type PVH switches offer ample clearances; castings of aluminum bronze alloy which make them exceptionally strong and light; and the design provides a powerful lever advantage to assure positive operation regardless of ice, corrosion, or long periods of non-operation.

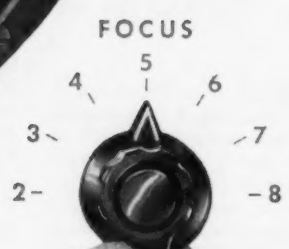
240-R

LM® LINE MATERIAL
Power Switching Equipment

DISTRIBUTION TRANSFORMERS

THIS IMPULSE TEST





FILAMENT

SCREEN LIGHT

EXCITATION

COULD SAVE YOU...$45

Estimate your possible savings in terms of all transformers on your lines

When General Electric started production-line impulse testing its distribution transformers in 1946 more than 15% of the units were rejected. These units had previously passed **all other tests.** Had these transformers been shipped, they might have given years of satisfactory service under normal conditions, or they might have failed under sudden stress.

By weeding out failures in advance it is conservatively estimated that the average life of distribution transformers is increased 15%. Based on the cost of a 25-kva, 2400-volt unit this means a $45 saving on each transformer.

Impulse testing makes the difference. Every unit 100 kva and below has both high- and low-voltage windings tested on the G-E production line without lightning protection of any kind. Any hidden weakness is detected automatically and the faulty transformer is rejected. This means that every G-E distribution transformer you add to your system has already been proven under greater stresses than encountered in normal service.

Look at the other money-saving features that prove "All transformers are not alike": **One-piece clamping bands,** for instance, save maintenance time. Reusable **Nitrile rubber gaskets** help save units from contamination. **AL/CU terminals** are designed to prevent both copper and aluminum conductors from loosening. **Strenicor terminal clamps** save terminals from breaking. **Super Melaglyp paint** saves up to two repaintings. **Nationwide warehouses** save utilities heavy inventory expense. **Service shops** can cut your repair and rebuilding costs.

For the complete story contact your nearest G-E Apparatus Sales Office or G-E Agent—or write to General Electric Company, Schenectady 5, New York.

431-36

dollar-saving features prove ATANA*

***ALL TRANSFORMERS ARE NOT ALIKE**
(make this simple comparison and see)

FEATURE	General Electric	Mfr. A	Mfr. B	Mfr. C	Mfr. D	Mfr. E
Production-line impulse testing	√			√		√
Nitrile rubber gaskets	√					√
One-piece clamping band	√					
H-v and l-v terminals handle both copper and aluminum conductors	√					
Strenicor pressure terminal clamps	√					
Super Melaglyp paint	√					
More than 100 warehouses	√	√				
Nationwide, company-operated service shops	√	√				

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GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

EW News Roundup

SIGNIFICANT ITEMS FROM THE EDITORS' NOTEBOOKS

ECONOMIC STORY — These two charts from the Department of Commerce tell their own story. Wages kept moving up substantially all through 1956 but corporate profits by no means kept pace.

Even in such a prosperous year as this, it takes management skill and plenty of initiative to cope with rising costs. Maybe that's why they call it "risk capital."

—EW—

Personal income was up $17½ billion over a year ago to a total of a $328½ billion annual rate, according to the U. S. Department of Commerce. For the first nine months of 1956, in percentage, the rate was up 6½% over the same period of 1955.

—EW—

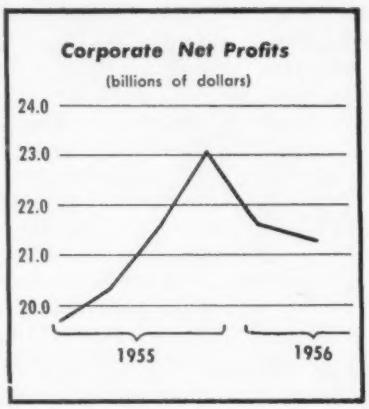
GOING UP—FPC's latest statistical bulletin estimates that public utilities will spend more than $5 billion for new plant and equipment in 1956 compared with $4.3 billion in 1955.

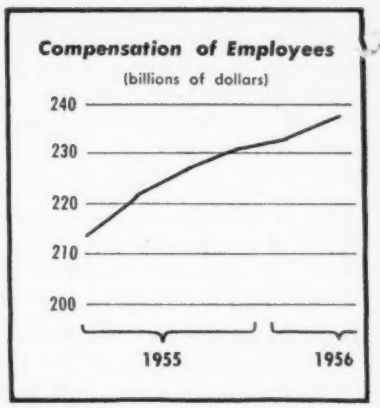
The bulletin notes that prospective trends for electric utilities through the fourth quarter are rising on the basis of estimates up through August.

—EW—

NEW AWARD — The Engineering College Research Council of the American Society for Engineering Education has announced a new major award in engineering education to recognize the research potential and accomplishment of young workers engaged in engineering research in a college or university.

Named in honor of the late president of the McGraw-Hill Publishing Co., the Curtis W. McGraw Research Award will be sponsored by the McGraw-Hill Book Co. and will include a cash prize to be given annually beginning in June 1957. The recipient will be selected each year by a special committee of the Engineering College Research Council.





U. S. Dept. of Commerce.

STANDOFF? — Crystal gazers, even with amateur standing, can foresee troubled times ahead for the Pacific Northwest with government power sympathizers still in the political saddle.

Sen. Wayne Morse (D-Ore.), Sen. Richard Neuberger (D-Ore.), Sen. Warren Magnuson (D-Wash.), Gov. Albert D. Rosellini (D-Wash.) and Rep. Frank LeRoux (D-Wash.) are just some of the men who favor public power and who are in positions to swing big clubs.

For the sake of the people—all of the people—of the great Pacific Northwest, it is hoped that the federal-power-or-nothing attitude is modified or abandoned in favor of an attitude that will add needed kilowatts in a fair, rapid and truly progressive manner. This cannot be done by excluding the active participation of the investor-owned electric utilities of the region.

—EW—

Five Pacific Coast plants of Westinghouse have carried off first honors in the light machinery division, metals section, in the 1955-56 industrial contest conducted by the National Safety Council. The plant in Portland set the pace with nearly 2,000 days without a lost-time accident.

REA Administrator David A. Hamil states that while he has known the back-breaking job of scooping grain, his son knows only the electrically operated grain elevator. And, Hamil says, his son is less concerned about where the electricity comes from than he is about reliability of service and cost. He said co-ops are serving a new generation that has little interest in the co-op as such, and they can no longer afford to sit back "and talk of the glories of the past 20 years."

—EW—

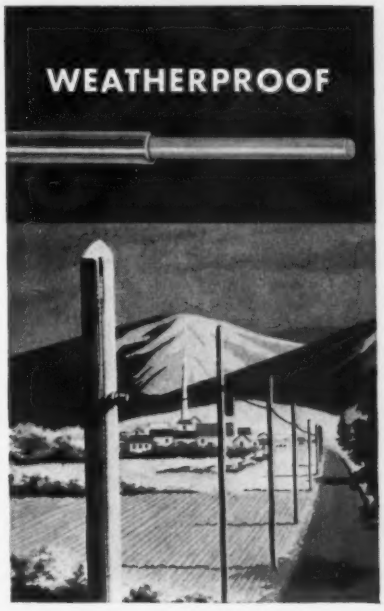
ENGINEERING AID—"Digital computers now are affording a significant release of engineering time and talent to bear on more complicated problems." These are the words of Robert M. Saunders, associate professor of electrical engineering at the University of California, Berkeley.

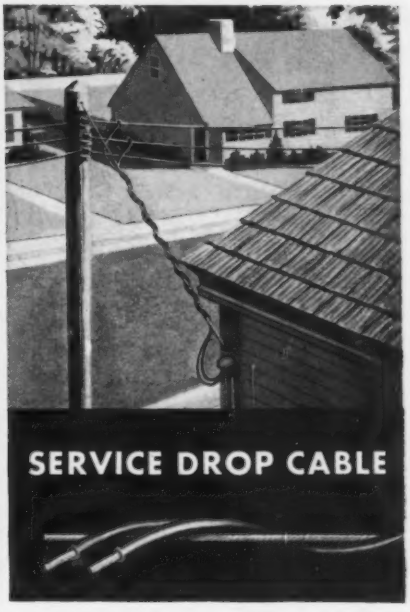
Professor Saunders also reports that the storage or "memory" ability of computers is not only adding speed to the solving of complex problems, it is also permitting engineers to take the time to find optimum solutions through repeated analyses.

To get net savings by using machines, though, except in cases of mass produced items or where there is a

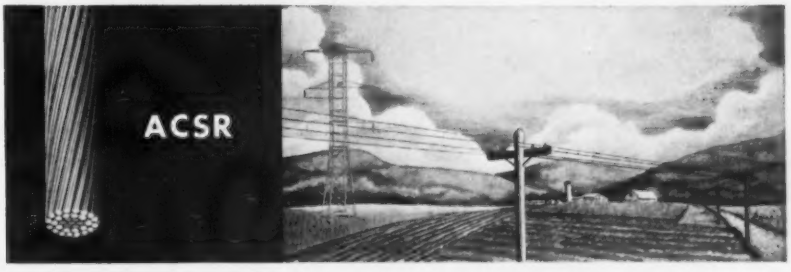
ALECTRAL

GENERAL CABLE'S





ALUMINUM CONDUCTOR



Built into its aluminum products are 75 years of General Cable's engineering and manufacturing experience. In this record are more than 25 years of successful performance of insulated aluminum conductors marketed as ALECTRAL. Available in ALL-ALUMINUM, ACSR, WEATHERPROOF and with RUBBER and THERMOPLASTIC insulations. A sound and economical investment for all voltage ranges.

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large dollar volume of a given piece of equipment, the scientists must still find improved ways to convert the design techniques and insight of the engineer into computer language.

Programming time and expense is still the bottleneck.

—EW—

NEW SYMBOL — During the next few weeks you will be seeing much of the accompanying symbol (we hope) representing the celebration of the second annual Electrical Week.

Plans at the national level, under the capable chairmanship of Union Electric's Merle Skinner, are well advanced. Preliminary reports indicate that Western communities will be holding up their end in bringing the story of the industry to the public during the week of Feb. 10-16, 1957.

—EW—

Recommended reading for Western utility folks is General Electric's new "Partners In Progress," which is the story of the company's growth in the West. You can get a free copy by writing to: Public Relations, General Electric Co., 235 Montgomery St., San Francisco 6, Calif.

—EW—

The Western friends of Copperweld Steel Co. will be pleased to know the company has won the bronze "Oscar of Industry" for having the best annual report of the small steel companies. The company was a winner in 1954, too, and runner-up last year.

—EW—

WHAT PRICE SAFETY? — Wilbur Kelly, president of Walter Kidde Nuclear Laboratories Inc., told the Atomic Industrial Forum that safety provisions for a 250-mw nuclear power plant probably would impose a penalty of about two mills per kwh.

Investment in safety for a $50,000,000 plant might total $4,500,000 or about 9% of the cost.

HATS OFF to Lineman Gene G. Lake of San Diego Gas & Electric Co. who saved the life of his working partner, David Rutter, by applying artificial respiration while high above the ground on a utility pole.

Rutter accidentally touched a 12,000-v power line while he and Lake were getting ready to work. Lake quickly reached him and applied artificial respiration for five minutes before Rutter regained consciousness. Two other crew members climbed the pole to assist Lake in lowering the injured man to the ground and a waiting ambulance.

For the courageous act, Lake received the Edison Electric Institute Medal and 13 crew members received Certificates of Assistance.

—EW—

Line Foreman Ole Svenson told a lineman: "Nope. We ain't goin' in to headquarters this weekend. I gave the Super my budget requests Monday."

—EW—

SOCIALISM—The continued advance of socialism is the fundamental problem confronting the electric utility industry and the whole U. S. economy, Harold Quinton, president of Southern California Edison, told the Trust Division of the American Bankers Assn. in Los Angeles.

He warned that "public power socialists" have not relaxed their efforts one bit in trying to gain effective control over the nation's power industry.

Quinton expressed optimism about the chances for a reversal of the 25-year drift toward socialism. He said the industry has begun to effectively inform the American public of the true cost of subsidy and who pays for it, and the public is responding to the truth.

—EW—

RACE—General K. D. Nichols speaking before the Society of American Military Engineers brought into focus the meat of the "who is winning the atomic race" debate. ". . . acceleration should be aimed at the objectives of achieving cheaper atomic power and not consist of participating in an international race to see who can build the most kilowatts of atomic power."

He said: "Once we achieve cheaper atomic power, the United States will also win the race for kilowatts."

On how to achieve atomic leadership, "If our objective was solely to bull through plants to produce a large number of kilowatts, a government

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GENUINE FWD PARTS

FWD doesn't skip the tough jobs ...works anywhere in any weather

When the shortest distance between two pole jobs is cross-country . . . you need FWD! New FWDs save time because you don't have to look for the level, easy way to get there. With FWD's unmatched power and traction you can travel straight to the job and do it, no matter how tough the terrain or weather. FWD is the only truck that is ready for line trouble emergencies—anywhere, anytime!

There's an important difference built into FWDs. They have full time, *true* four or six-wheel drive with both power *and* weight proportioned to each driving axle. This is the only way you are assured that every pound of weight is utilized to produce the kind of tractive power that doesn't skip the tough jobs . . . works anywhere in any weather!

FWD

Heavy-Duty Vehicle Specialists

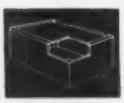
THE FOUR WHEEL DRIVE AUTO COMPANY • **Clintonville, Wisconsin** • *Canadian Factory* • Kitchener, Ontario

CAST BOXES BY HOPE
Hundreds of
STANDARD SIZES

Eleven complete lines of gasketed weatherproof Boxes by Hope carrying Underwriters Laboratories approval. A complete line of explosion housings manufactured to the standards of the Underwriters Laboratories, Inc.

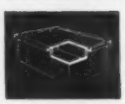
All Boxes by Hope are of strong, dense cast iron with standard finish of hot dip galvanize—enduring for long service life —attractive in appearance.

STANDARD BOXES



UNFLANGED JUNCTION AND PULL BOXES
H1200 Type • 164 sizes
from 4 x 2 x 2 to 48 x 36 x 17

HINGED WEATHERPROOF BOXES
H3200 Type • 128 sizes
from 5 x 5 x 3 to 36 x 36 x 12



FLANGED RECESSED COVER BOXES
H7000 Type • 51 sizes
from 4 x 4 x 3 to 30 x 24 x 12

CHECKERED COVER SIDEWALK BOXES
H5800 Type • 53 sizes
from 6 x 6 x 4 to 36 x 24 x 14

EXPLOSION HOUSINGS
by Hope, for Class 1, Groups C and D hazardous locations.

Order BOXES BY HOPE — standard or with custom modifications — from your electrical distributor. Write to Hope, on company letterhead, for new catalog.

Hope representatives are in all key marketing areas, including Portland, Denver, Dallas, Houston, New Orleans, Atlanta, Chicago, Cleveland, Philadelphia, Boston, San Francisco, Los Angeles, Newark

HOPE
ELECTRICAL PRODUCTS CO., INC.
57 Long Avenue, Hillside, New Jersey
Elizabeth 4-7837

program might be in order. However, with the objective to get cheaper power, our free enterprise system has a better record of past performance for getting economic competitive results when over-all costs are considered."

—EW—

Burndy Engineering Co. Inc. has undergone a name change. The new, and less bulky, title is Burndy Corp. Executive Vice-President Marvin Lee says: "The change in name . . . reflects the broadening of the organization's activities."

—EW—

NEW GIMMICKS — They say in Hollywood that an actor is not a success until he or she has endorsed some product or had some product named after him. By that measure, the Live Better . . . *Electrically* campaign has arrived.

Through a New York concern, Live Better . . . *Electrically* wallpaper and Live Better . . . *Electrically* drapery bearing both the emblem and the slogan are now available. There ought to be quite a market, too. Think of all the conference rooms, auditoriums, demonstration kitchens and hundreds of other places that people gather together to hear the electrical story. What could be nicer than a background reminder to LBE?

—EW—

The Acheson Medal of the Electrochemical Society has been awarded to Dr. R. M. Burns, senior scientific adviser to Stanford Research Institute. The award acknowledges Dr. Burns' outstanding work on the corrosion of metals.

—EW—

DO YOU?—Do you, at this moment, have an unmailed letter in your pocket? If you have, take time to mail it, then read what happened in Tacoma recently.

The Tacoma Utility Board opened bids on steel structures and electrical equipment for a City Light substation, and subsequently awarded the contract to an apparent low bidder.

Investigation later revealed that a lower bid by a second manufacturer had been delivered at noon a week before—to a city hall janitor who forgot to pass it along.

A new contract was written.

PERMANENT?—The Inter-Industry Farm Electric Utilization Council may become a permanent, nonprofit corporation. A committee has been appointed to investigate the possibility and to proceed with incorporation if it proves feasible.

Our contact with the organization has been mostly through the Colorado Farm Power Council, one of the state suborganizations, which has done some worthy promotion and education work in the two years of its existence.

Investor utilities, REA borrowers, manufacturers and distributors are pitching in with time and effort to show farmers the electrical equipment and appliances that will help rural America progress with the rest of the nation.

There are many benefits coming from the organization, and one interesting thing to watch is the way grassroots education is paying off in good electric utility public relations.

—EW—

When Colorescent Lighting Corp., Elizabeth, N. J., developed a new light source that is said to contain the best features of both fluorescent and cold cathode, they chose to call it "Tepid Cathode." It is said to have about the same efficiency as hot cathode lamps but is 30% brighter than cold cathode lamps.

—EW—

TIGHT MONEY—Two examples of the effects of the tight money supply have turned up. California Electric Power Co. will sell $8,000,000 worth of first mortgage bonds to Kidder, Peabody & Co., low bidder. *Interest is 4½%.*

A $10,000,000 bond issue by Salt River Power District goes to a syndicate headed by First Boston Corp., Eastman Dillon & Co., Union Securities, Halsey Stewart, Shields & Co. & Associates, and The First of Arizona Co. *Average net interest cost is 4.09067%.*

We have recently reported other cases of high interest rates that caused postponement of utility bond issues and substitute stock sales.

—EW—

CHAIN REACTION—The long Westinghouse strike that ushered in 1956 is having some effects similar to the old game of crack-the-whip—it happened then but is being felt now.

Because of the strike, generator installations at Chief Joseph Dam are behind schedule. The result is a low-

▲ Bill Johnson (right), Superintendent of Spang's Coupling Department, points out top-quality electroplated finish and uniform threads on Spang HD Coupling to Spang customer and Spang's Chief Inspector, Bill Mickley.

Mark Glusic removes a basket of couplings from the electroplating tank. This finishing process protects threads, ▼ gives extra protection to exterior surfaces.

Nobody Makes Couplings Better than SPANG®

Check these 6 top-quality features that bring you easier, better conduit installations

1. **Top-grade steel** . . . SPANG Couplings are made of top-grade, free-machining steel which provides easy threading for best results during coupling manufacturing.
2. **Quality-controlled processing** . . . couplings receive the same care in manufacturing as SPANG HD Galvanized Conduit. Thorough testing and inspection, too!
3. **Galvanized finish** . . . hot dipped in lengths before cutting and threading . . . another SPANG extra.
4. **Electroplated** . . . inside and outside after threading to protect interior threads and bearing faces and give exterior surfaces double protection.
5. **Clean threads** . . . perfect every time! No burrs, no binding, easy to work with!
6. **No galvanic action** . . . electroplated and galvanized finish prevents metal-to-metal contact between couplings and conduit . . . avoids any galvanic action.

If it's *quality* you want, SPANG Couplings have it! Your local SPANG Distributor carries the full range of coupling sizes along with the rest of the complete SPANG Conduit line. Let him fill your next order.

SPANG® CONDUIT

SPANG-CHALFANT
Division of The National Supply Company
GENERAL SALES OFFICE:
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District Offices and Sales Representatives in Principal Cities

the new
complete source
of information on
fine FANNER
Superformed
LINE CONDUCTOR
ACCESSORIES

the new
FANNER CATALOG

This new FANNER Catalog illustrates and describes the wide range of Superformed Line Conductor Accessories . . . gives selection tables, application data and suggested installation methods. Get acquainted with this catalog now so that when you need accessory items for overhead distribution and transmission lines, you can take advantage of the many extra features of Fine FANNER Superformed products. Each product in the FANNER Superformed line is precision manufactured to install easier and perform better on the job. Careful packing insures safe delivery and simplified storage. Highest quality materials provide long life regardless of the type of installation. With all their extra features, FANNER Superformed products cost no more than ordinary products.

For the latest data on line conductor accessories — information that will be of exceptional value to you, write for the new FANNER Catalog EP6 today!

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THE FANNER MANUFACTURING CO.
Electrical Products Division
Brookside Park • *Established 1894* • Cleveland 9, Ohio

Fine FANNER Superformed

AGENTS AND DISTRIBUTORS IN PRINCIPAL CITIES

ered production of electricity, which in turn could cause Northwest private utilities to turn to expensive steam power.

We hear that Puget Sound Power & Light Co., Washington Water Power Co., Pacific Power & Light Co. and Portland General Electric Co. have purchased insurance policies to help cover the extra cost if a shortage should occur.

If the Columbia and its tributaries fail to carry enough water, the companies pay the additional expense up to a certain point and the insurance policies cover from that point upward.

—EW—

HOW BIG IS BIG?—Have you heard of the new proposal that is making the rounds that would limit corporations in size to 1% of the gross national product, a move to keep business organizations from becoming too powerful.

It so happens that only four corporations in the U. S. would be affected by such a rule, even if it could be legislated. However, by the same formula, the federal government is about fifteen times too big.

—EW—

OUCH!—The Tacoma City Council decided that the city manager should not be drawing less pay than the utilities director.

David Rowlands, who became city manager this year, has a starting salary of $16,800. Dean Barline, utilities director, is in the same salary schedule but has seniority enough to be drawing $18,000.

The council cut Barline back to $16,800 to even things up.

—EW—

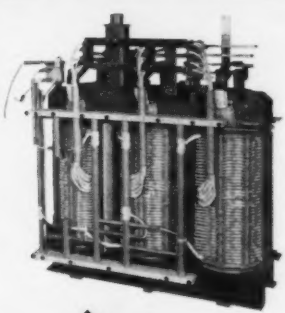
DYNAMIC—The electrical industry is "one of the principal sources of opportunity and growth in American business, attracting new competitors all the time." This is a statement by Ralph J. Cordiner, president of General Electric Co., made before a luncheon meeting of the National Electrical Manufacturers Assn. at Atlantic City.

"This year the output of electrical goods is estimated to be about $20 billion—more than double that of 10 years ago. Even if we continue to serve our customers only as well as we have in the past decade, we can see that by 1976 the market for electrical products reported by NEMA should be in the order of $90 billion at today's prices," he said, and the industry is "vital to the faster progress of every man, woman and child in the country.

From coast to coast...

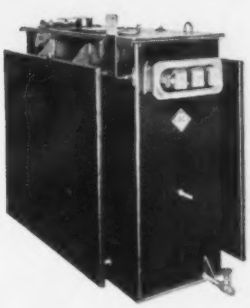
Allis-Chalmers Network Transformers

Are meeting growing system needs with long-term, reliable operation. Compact design, rugged construction, and easy maintenance features make A-C transformers your best buy for network expansion. Call your nearby A-C office for information, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wis.



COMPACT, LOW-LOSS DESIGN

Thermal capacities are high for severe load conditions. Sturdy, time-proved core and coil construction meets repeated short-circuit stresses of network operation.



PAN-TYPE RADIATORS

This optional design offers advantages in ease of cleaning, painting and handling, with cooling efficiency equal to conventional radiators.

A-C ALLIS-CHALMERS

ALLIS-CHALMERS

LIVE BETTER ELECTRICALLY

A-5059

now...

A complete series of BTC

STRAIGHT LINE CLAMPS

DROP-FORGED from aluminum or steel

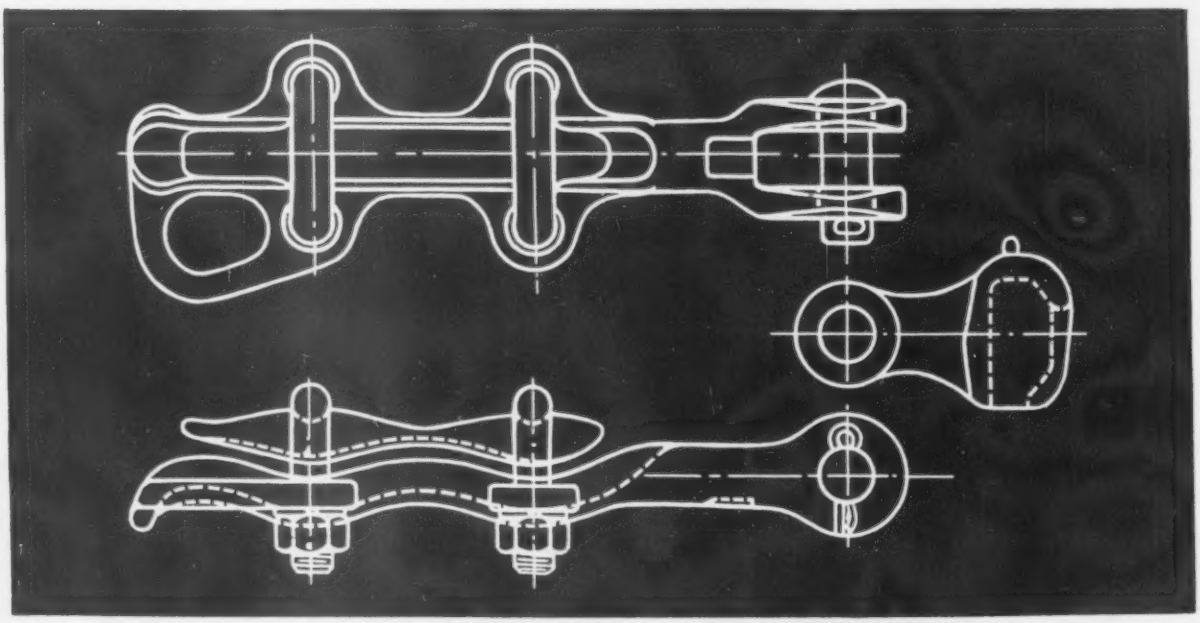
NOW BTC offers a complete series of Drop-Forged Aluminum or Steel Straight Line Clamps, providing an adequate bore size range for the distribution dead end service required of straight line clamps.

These clamps were developed for distribution, light transmission and sub-station use on all conductors, including Copper, All-Aluminum, 18 x 1 and other A.C.S.R. conductors. Lightweight, amply strong, they follow advanced clamp design.

The corona-free beaded aluminum or steel body of BTC Straight Line Clamps is drop-forged for greater strength. The smooth die-forged wave form cable seat develops adequate slip strengths. Rated ultimate strength is 15,000 lbs. for steel clamps; 12,000 lbs. for aluminum clamps. The loop is of ample size to accommodate come-along hook or shackle. All steel parts are hot-dip galvanized to give longer service.

The point of first conductor-to-clamp contact in BTC Straight Line Clamps is well within the bell-mouthed clamp end. The section of conductor subject to vibration bending is carried over a generous radius and length and is free from clamping pressure which is first applied very lightly, then gradually increased into the high pressure area under the U-Bolts. The design prevents destructive localized concentration of tension and vibration-bending stresses and insures against high clamping pressure damage to conductor at clamp mouth.

The assembly can be supplied with a drop-forged Socket Adapter. Use of Copper or Aluminum Liners is recommended in the steel clamps.



CATALOG NUMBER	BODY-KEEPER MATERIAL	ADAPTER	BORE SIZE MIN.	BORE SIZE MAX.	ULTIMATE STRENGTH
5099	Steel	None	.30	.60	15,000 lbs.
5147	Steel	Socket	.30	.60	15,000 lbs.
5399	Aluminum	None	.30	.60	12,000 lbs.
5447	Aluminum	Socket	.30	.60	12,000 lbs.
5100	Steel	None	.46	.90	15,000 lbs.
5148	Steel	Socket	.46	.90	15,000 lbs.
5400	Aluminum	None	.46	.91	12,000 lbs.
5448	Aluminum	Socket	.46	.91	12,000 lbs.
5101	Steel	None	.65	1.25	15,000 lbs.
5149	Steel	Socket	.65	1.25	15,000 lbs.
5401	Aluminum	None	.65	1.25	12,000 lbs.
5449	Aluminum	Socket	.65	1.25	12,000 lbs.

Specify BTC From Your Insulator Manufacturer

Drop-Forged BTC Hi-Line Hardware

THE BREWER-TITCHENER CORPORATION, Cortland, N. Y.

We feel justifiably proud of having pioneered a service which has been so favorably received by so many companies in the West, and having treated, in 15 years, over two million standing poles without one dissatisfied customer.

DAN KAMPHAUSEN CO.

DENVER, COLORADO

Pole Inspectors & Treaters, Inc. Pole Sprayers, Inc.

SAVINGS—so important that no well managed Utility Company can afford to overlook them.

The economies of keeping older standing poles sound and in place are so great that almost any formula will show big dollar savings for every year that replacement can be deferred. Standing pole preservation is sufficiently important to warrant some straight thinking and careful planning so as to avoid staggering accumulating replacement costs.

TWO TIME PROVEN TREATMENTS

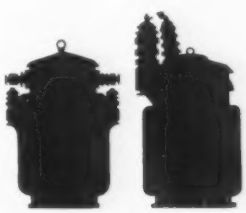
1. Below groundline inspection and treatment reliably extends pole service life for 10 years.
2. Above groundline treatment provides 25 years of additional service life.

All work is done by our especially trained and experienced personnel.

TWO NEW LINES OF WESTINGHOUSE TRANSFORMERS NOW GIVE YOU

Unprecedented 20% increase in overload capacity . . . without sacrifice of service life

. . . proved by a revolutionary new concept of accelerated life testing which telescopes 30 years' service into 3. Here they are: (left) new, Type S conventional transformer with higher overload capability and optional, new thermal-duty indicator; (right) new CSP® transformer with higher breaker trip settings. These new tools for more effective load management will increase return on your distribution investment.



THE COMPLETE NEW LINES OF WESTINGHOUSE TRANSFORMERS . . .

Now up to 13″ shorter, 33% lighter without sacrifice in thermal capacity; mean substantial change-out savings in premium pole space

WALL MOUNTED TRANSFORMERS: 2400 and 4800 VOLTS

25 kva: Old—44″, 505 lbs.
New CSP—35″, 471 lbs.
New Type S—35″, 455 lbs.

37½ kva: Old—46″, 731 lbs.
New CSP—43″, 658 lbs.
New Type S—43″, 635 lbs.

50 kva: Old—46″, 846 lbs.
New CSP—43″, 755 lbs.
New Type S—43″, 740 lbs.

COVER MOUNTED TRANSFORMERS: 7200 and 7620 VOLTS

25 kva: Old—48″, 521 lbs.
New CSP—41″, 497 lbs.
New Type S—41″, 475 lbs.

37½ kva: Old—50″, 765 lbs.
New CSP—48″, 705 lbs.
New Type S—48″, 680 lbs.

50 kva: Old—50″, 831 lbs.
New CSP—48″, 760 lbs.
New Type S—48″, 730 lbs.

WATCH WESTINGHOUSE

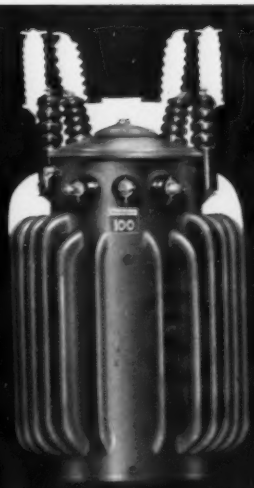
Here's a way to save on both installation time and equipment costs. Transformers of the next greater kva size can now be mounted in the same space without relocating secondaries. Make replacements, immediate or future, on the same pole—a real advantage where joint pole use is a practice. New installations require smaller poles. Specify Westinghouse, the only complete line of cover and wall-mounted bushing transformers with sweeping reductions in heights and weights.

75 kva: Old—52″, 1180 lbs.
New CSP—44″, 985 lbs.
New Type S—44″, 960 lbs.

100 kva: Old—52″, 1395 lbs.
New CSP—46″, 1160 lbs.
New Type S—46″, 1120 lbs.

167 kva: Old—58″, 2010 lbs.
New Type S—48″, 1490 lbs.

75 kva: Old—56″, 1210 lbs.
New CSP—50″, 1010 lbs.
New Type S—50″, 975 lbs.

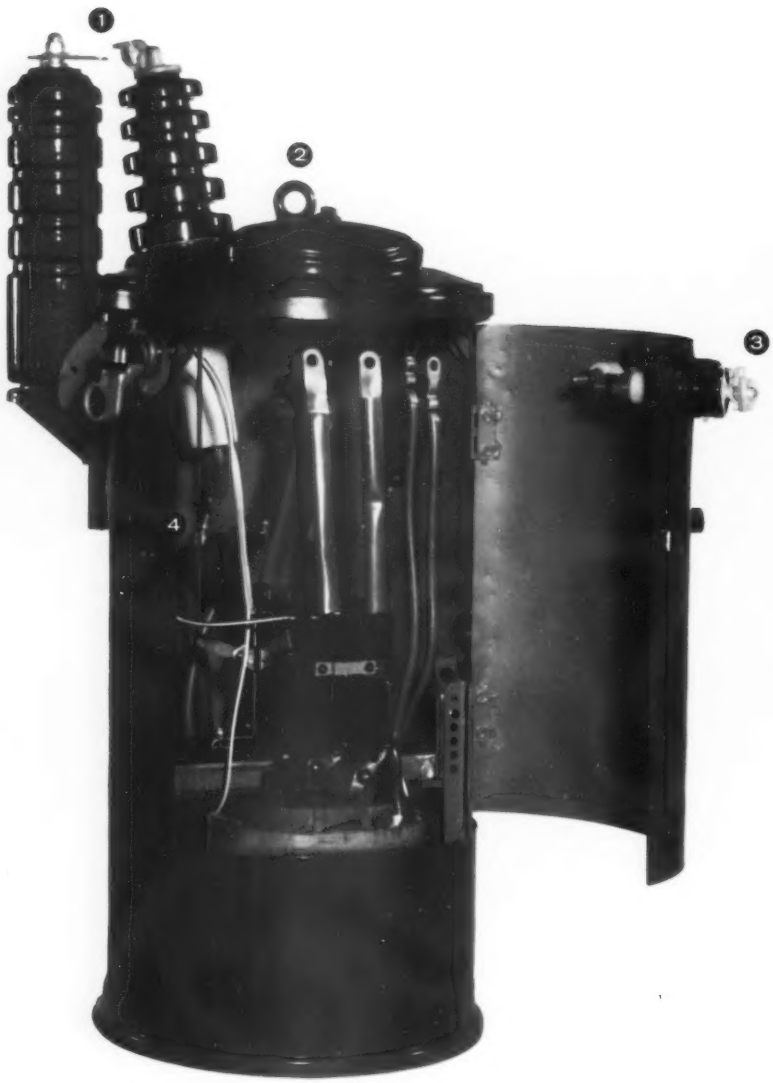


100 kva: Old—56″, 1420 lbs.
New CSP—54″, 1270 lbs.
New Type S—54″, 1230 lbs.

167 kva: Old—64″, 2240 lbs.
New Type S—51″, 1515 lbs.

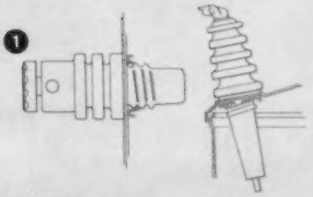
*WHERE **BIG** THINGS ARE HAPPENING FOR **YOU**!*

Six new exclusive ideas
simplify operating problems



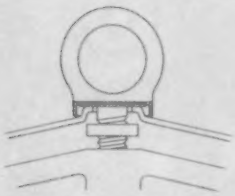
NEW THERMAL-DUTY INDICATOR . . . simplifies overload monitoring. Optional on Type S (conventional), it records total overload hours for the life of the transformer.

1



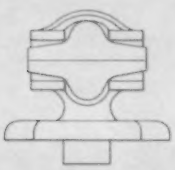
NEW THREADED HV BUSHINGS . . . simplify maintenance. Spring-grip nut, internally mounted, improves bushing seal.

2



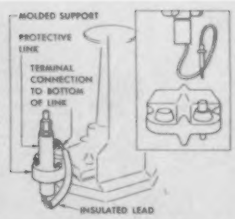
CONVENIENT LIFTING EYEBOLT . . . (3-50 kva) eliminates slings, chains, cable; saves time in mounting transformers. Every unit pull-tested at twice its own weight.

3

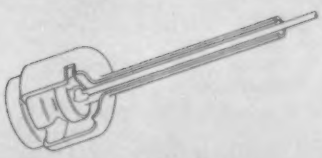


NEW LV TERMINALS . . . take both Al and Cu conductors. Larger terminal with captive bolt has contact area increased 25%, lowers resistance.

4



NEW PROTECTIVE LINK CHANGE-OUT . . . turns former major repair to simple, routine maintenance on all CSP® transformers, wall- or cover-mounted.

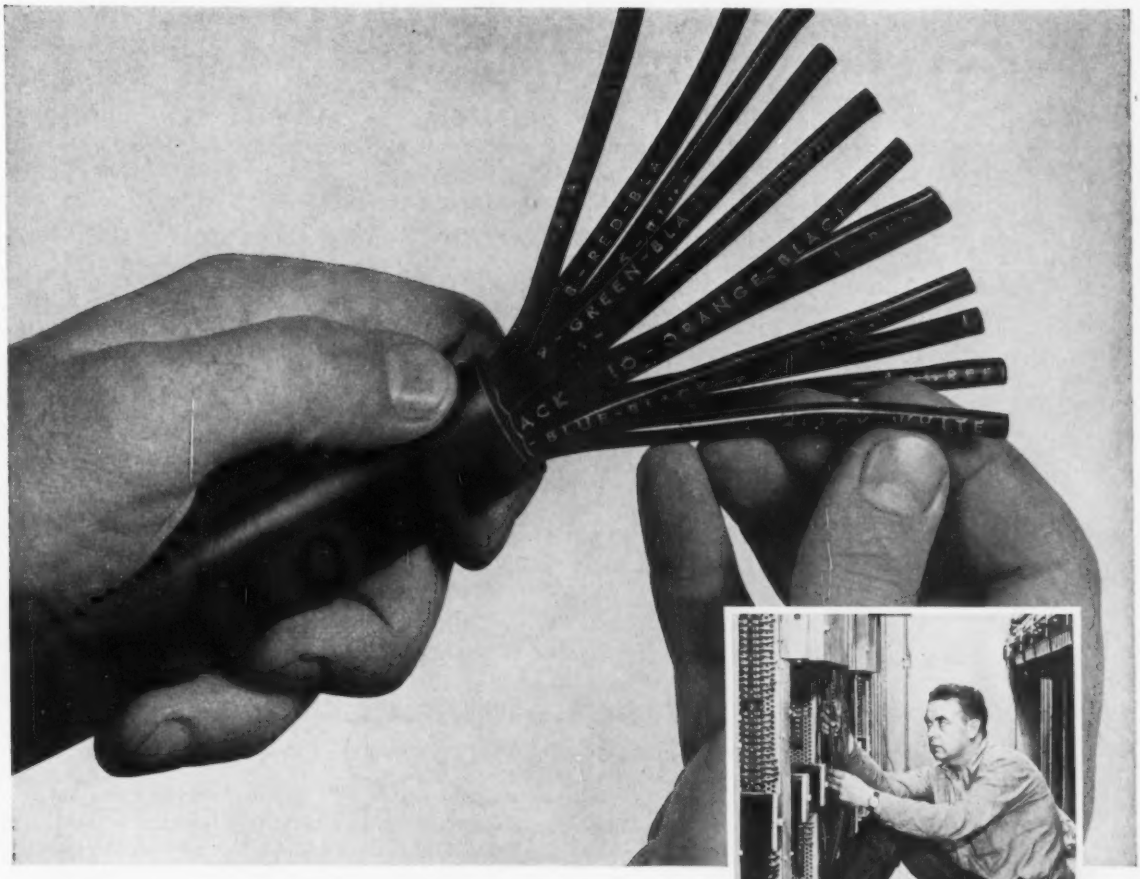


NEW PLASTIC BIRD GUARD . . . prevents line lockout caused by birds or squirrels. Optional equipment, it snaps easily over cover-mounted hv bushing.

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING FOR **YOU**!*

J-70780
Litho in U.S.A.



Color-coded and numbered every 1½"

New Rome station control cable assures quick and positive circuit identification

You can reduce installation expenses and the cost of routine maintenance by specifying Rome control cable (CRO-1) for your next job. Rome's new surface-printed color coding makes it much easier to quickly identify control circuits, even when light is poor or when handling has dirtied conductor coverings. Every conductor is color-coded and numbered *on both sides* at intervals of 1½" or less, and permanently clear white lettering provides maximum legibility.

Three different types of Rome control cable are available:

RoZone insulated—RoPrene sheathed. This is the ultimate in control cable design and performance. Conductors are insulated with RoZone, a high-quality oil-base compound and each conductor is individually sheathed with RoPrene (Neoprene). A RoPrene jacket provides over-all protection. Ask for Type CRO-1.

RoMarine insulated—RoPrene sheathed. This is a more moderately priced, high-quality, general purpose design. Individual conductors are insulated with a heat- and moisture-resistant synthetic rubber compound, and the over-all jacket is RoPrene (Neoprene). Specify Type CRM-1.

Rome Synthinol insulated—Rome Synthinol or RoLene sheathed. This cable features a quality thermoplastic construction with Synthinol insulation (polyvinyl chloride) protected by a Synthinol or RoLene jacket. A small diameter moderate cost control cable, this is our Type CT-2.

Specify Rome station control cables for your next job. Contact your nearest Rome Cable representative for more information—or write to Department 800; Rome Cable Corporation, Rome, New York.

ROME CABLE
CORPORATION

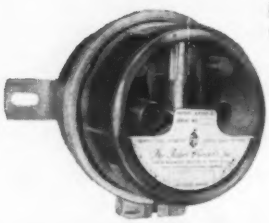
ASK YOUR MAN IN THE FIELD ABOUT THE

PROTECTION

IN FISHER-PIERCE
PHOTOELECTRIC LIGHTING CONTROLS

Lighting engineers who have specified F-P controls for installations know that a basic reason for the highly dependable operation of these controls is their carefully engineered *protection* against surge voltages, transients and lightning. Here are specific examples: components are spaced to withstand a *minimum* of 3000 volts RMS between any circuit point and grounded case, without breakdown; F-P tests to *5000* volts; basic insulation level as high as 7500 volts without arrestor . . . control circuit and load can both be fused against transients and surges . . . design provides fail-safe operation, so that controlled load remains on or becomes energized in the event of any functional failure . . . transformer is the type which isolates the supply voltage from the control circuit . . . components are all operated well below maximum ratings . . . the load relays used in F-P controls will handle an inrush current ten times the steady state current . . . larger controls can be equipped with accessory lightning arrestors. Protective design features like these pay off in lower installation *and* operating costs. And *only* F-P controls combine such protection with these four other important features:

64400



63300C

COMPONENT QUALITY . . . Pre-aged, long life tubes. Wire wound potentiometer. Metal encased and ceramic capacitors. Non-hygroscopic 1P39 phototube. Balanced armature Sigma sensitive relay.

DESIGN ADVANTAGES . . . Can be installed, serviced or removed safely and easily. Wide mounting versatility and orientation *after* bracket installation.

ADAPTABILITY . . . Three basic series and numerous models for all mounting requirements, operating voltages, load capacities and desired contact arrangements.

DEPENDABILITY . . . Proven by the thousands of F-P controls used by hundreds of utilities, over the past ten years.

Fisher-Pierce Bulletins, available upon request, give complete specifications and operating data.

THE FISHER-PIERCE CO., INC.
43 Pearl Street, So. Braintree, Boston 85, Mass.

Rely on Graybar . . .

ESPECIALLY IN EMERGENCIES

Graybar's long experience in serving the everyday needs of utilities is especially valuable when lines go down.

A nation-wide network of Graybar offices and warehouses provide ready accessibility of pole-line supplies. You can depend on the fastest possible deliveries of emergency replacement items —wherever and whenever they are needed.

Experienced Graybar personnel have developed the know-how needed to initiate immediate action and efficient follow-through from working closely with utilities daily and through emergencies of all kinds.

Moreover, Graybar is totally owned by its operating and retired personnel. That's why you're sure to get, especially in emergencies, *personal* service from people who have a *personal* interest in giving you the assistance you need, when you need it.

619-812

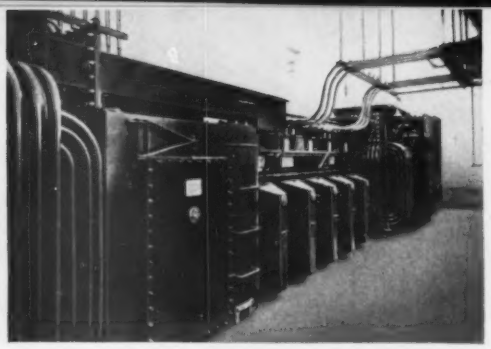
Graybar Electric Company, Inc.
420 Lexington Avenue, New York 17, N. Y.

Call Graybar first for...

IN OVER 130 PRINCIPAL CITIES

1931

FIRST UNIT



1 Sam's first Unit Substation was installed on an electric utility system in 1931. It is still in operation, still carrying load.

This is the story of "SUBSTATION SAM"
and a quarter century of great importance
to the electrical industry.
It's the story of 25 years of
Unit Substation progress.

25 Years of Helping Electrify America

2 The depression years momentarily diverted Substation Sam's sales attention...

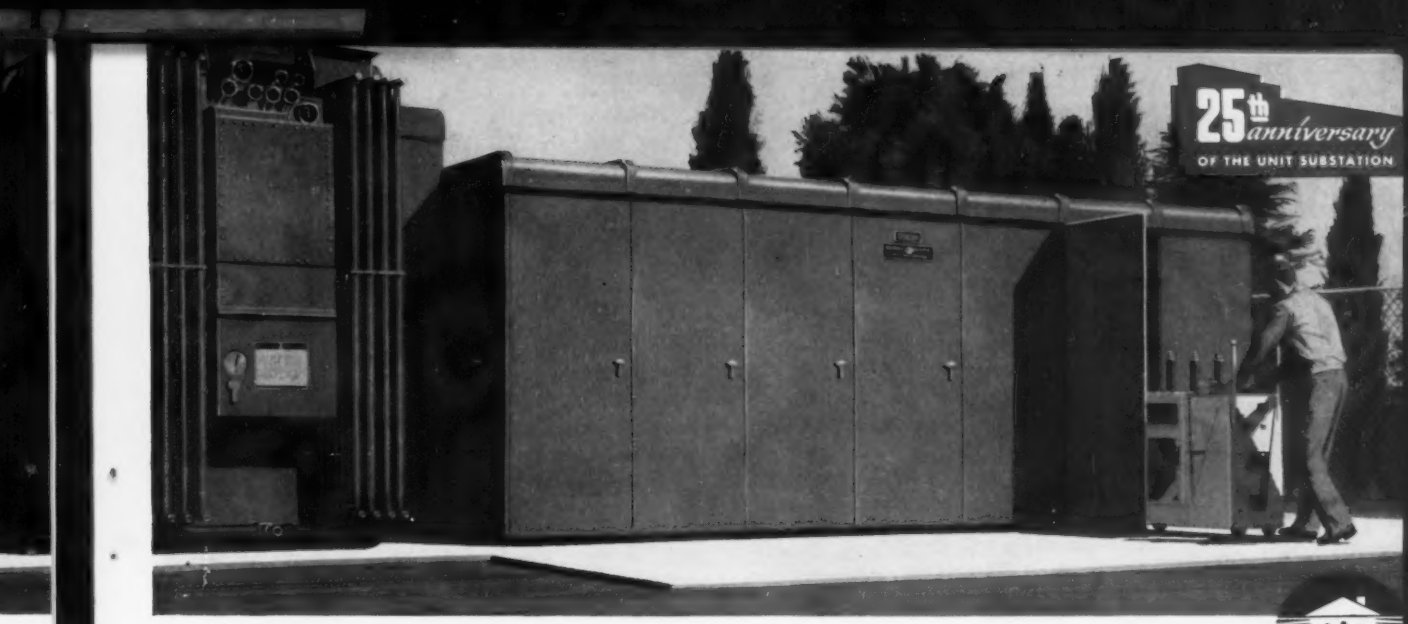
3 Sam's Mobile Unit Substation, dubbed the "Utility Fire Engine," appeared on the scene....

4 In "39, Sam found industry still "buying a carload of copper" to distribute plant power....

6 Sam moved his Substation underground—helped eliminate drudgery, speed mine electrification.

7 Sam's Control-Center Substation helped speed mechanization and automation in industry.

8 Buildings big or small rely on Sam's Load-Center Unit Substations.



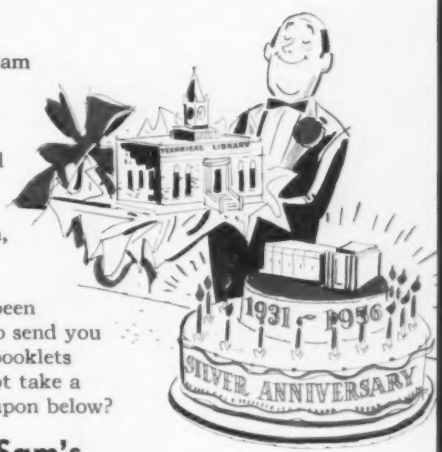
LIVE BETTER ELECTRICALLY

with General Electric Unit Substations

5 The introduction of Load-Center Unit Substations meant "More Power to America..."

9 Sam's Substation has "taken root." His influence affected numerous product developments.

THIS YEAR, Substation Sam has joined the Quarter Century Club. His first Unit Substation has completed 25 years of continuous service. To celebrate the occasion, an outstanding "Silver Anniversary Technical Library" has been prepared and we'd like to send you copies of the handsome booklets that make it up. Why not take a minute to fill out the coupon below?



Have you seen Sam's Silver Anniversary Technical Library?

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General Electric Co.
Schenectady 5, N. Y.

Please send me, without charge, copies of the booklets that make up your Silver Anniversary Technical Library on Unit Substations.

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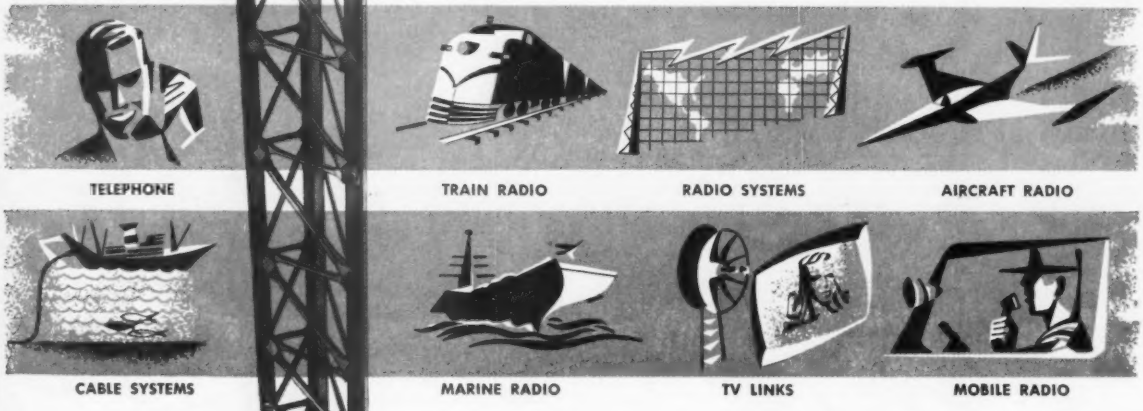

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IT&T *pioneered* microwave . . . IT&T *knows* communications . from the simplest inter-office dial telephone system to intercontinental radio and cable companies serving every corner of the earth. This vast, collective experience, covering system *manufacturing* and system *operation*, is the *plus value* you get *only* with Federal Microwave!

Federal is the system especially designed for pipelines, railroads, utilities, telephone companies, municipalities, highways, TV stations and others . . . meeting every need for high-quality operation of communications, supervisory and control functions.

Whatever your distance, terrain or circuit requirements . . . look to Federal for microwave systems of maximum versatility and dependability . . . built by communications experts . . . and *"Certified by a World of Research."*

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Federal Telephone and Radio Company
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Mr. Vernon Walters and Mr. H. A. Roehling of Walters Electric Co., Los Angeles, Cal.

"We're very happy with Day-Brite fixtures—they are really built. They're quality construction all the way, even to the smallest detail. That means a lot to us. They go up better, quicker—give us no trouble in installation—maintenance is easy and inexpensive—everybody's happy!

"When we put in a Day-Brite job, we're finished—and that's it. There are no call backs, no kicks. Result: Our customers are pleased, our profits always good."

These comments by Vernon Walters and H. A. Roehling are not unusual when the talk turns to Day-Brite fixtures. Contractors all over the country feel the same way.

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DECIDEDLY BETTER DAY-BRITE Lighting Fixtures

Day-Brite Lighting, Inc.
5412 Bulwer Ave.,
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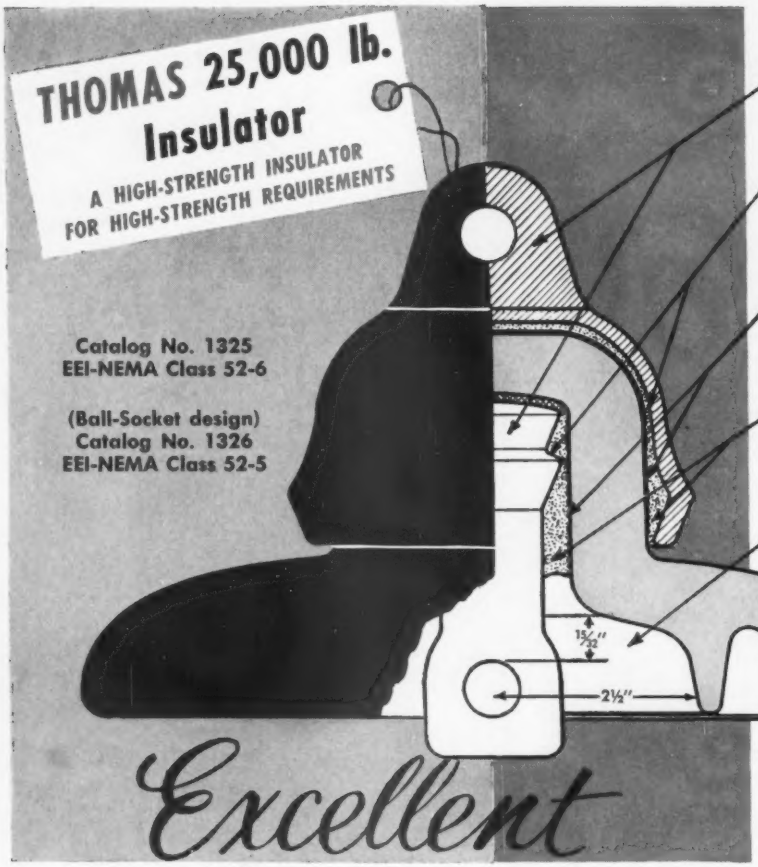
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A HIGH-STRENGTH INSULATOR
FOR HIGH-STRENGTH REQUIREMENTS
Catalog No. 1325
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(Ball-Socket design)
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High-strength forged steel cap and stud, hot-dip galvanized.
Asphaltic compound treatment of metal and porcelain prevents destructive thermal activity and impact damage.
Special high-strength sanded surfaces provide positive gripping areas for cementing cap and stud to porcelain.
Special Insulator Cement — steam-set under mechanically controlled conditions of temperature and humidity.
Extra large clearance between porcelain and stud facilitates assembly or disassembly, attachment of clamps or fittings, hot-line work, cleaning, etc.
15/32"
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Full droop of porcelain shell and depth of petticoats yield full-value leakage length and greater freedom from cascading arcs.
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"Specify Thomas"—The Best by Line Test

Service Records

... beginning in 1920 attest to enviable performance records which now add up to an astounding *2 million service-years* for this "Thomas Quality" unit.

As the demand for higher strength insulators increases, Thomas offers this unit in both Clevis and Ball & Socket designs. Both incorporate all the latest improvements in quality manufacture and design plus an unexcelled, time-tested performance record. With the accent on quality you get a custom-built insulator for your most severe service . . . there's a Performance-Proved difference.

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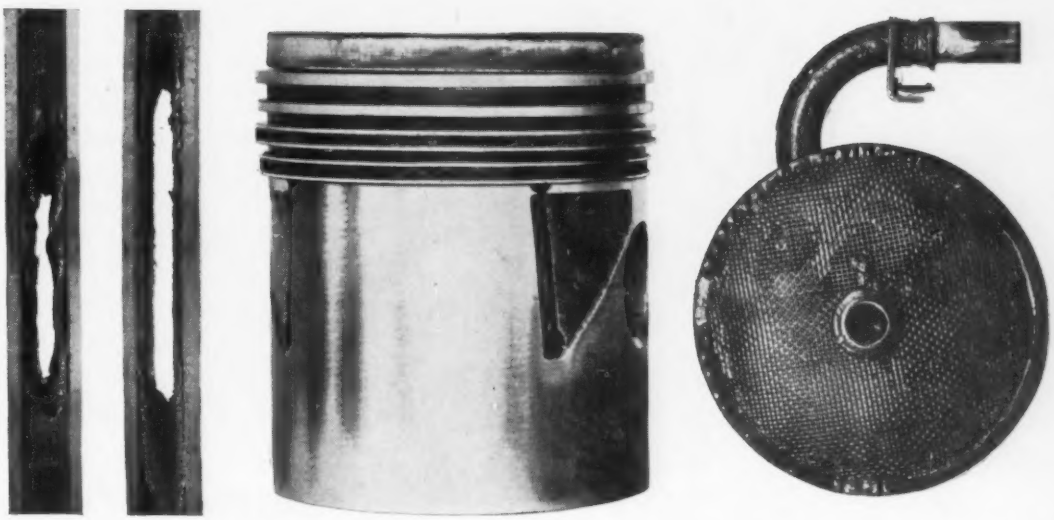
Standard Engineer's Field Report

CASE HISTORY
LUBRICANT RPM 10-30 Special Motor Oil
FIRM Yellow Cab Co., Stockton, Calif.

New oil increases oil mileage up to 45%, gas mileage up to 10% for fleet operator



WITH RPM 10–30 SPECIAL MOTOR OIL in their fleet of 32 taxis, the Yellow Cab Co. of Stockton, Calif., was able to boost oil mileage up to 45%, gasoline mileage up to 10% resulting in substantial savings in each vehicle. Oil ring plugging was practically eliminated. Note in photographs above how ring at left (lubricated with conventional heavy duty SAE 30 grade oil) is almost completely clogged after 30,000 miles of service. Ring on right (using "RPM 10–30 Special") is still free and clear, meaning less oil consumption, increased protection against wear. Clean piston (center) and oil screen (right) show how this new multi-grade oil held deposits to a minimum. A typical unit in the fleet had a daily average of 55% driving, 5% stopped with engine idling, 40% stopped with engine off—and made 25 engine starts.

10-30 SPECIAL RPM MOTOR OIL

TRADEMARK "RPM" REG. U. S. PAT. OFF.

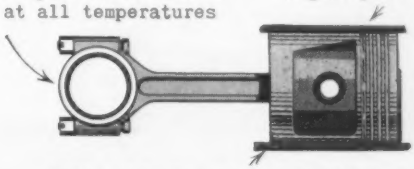
As a result of these savings in oil and gasoline consumption, the company now uses RPM 10–30 Special Motor Oil exclusively in all vehicles.

FOR EXPERT HELP on lubrication or fuel problems, call your Standard Fuel and Lubricant Engineer or Representative, or write to 225 Bush Street, San Francisco, California.

Why RPM 10-30 Special Motor Oil cuts operating costs

Multi-grade insures complete lubrication at all temperatures

Detergent keeps engine parts clean



Anti-oxidant resists deterioration of oil and formation of lacquer

STANDARD OIL COMPANY OF CALIFORNIA

o.z. pull boxes

SAVE TIME! SAVE SPACE! SAVE MONEY!

The easiest, most economical way to speed installation of conduit—of any size from ½" to 6"—is to use O. Z. Pull Boxes. Two hot dip galvanized malleable iron units fitted to an oversize length of pipe replace the conventional, bulky and costly pull box . . . cuts labor time in half!

O. Z. Pull Boxes are available in four designs: standard (Type "PB"); weather-tight (Type "PBW"); explosion proof and thin wall conduit. The oversize sleeve can be cut to required length "on the job" from standard conduit, or furnished to your specifications by O. Z.

Call your local O. Z. distributor, or write direct to the company for complete information.

1. Slide head "A" with sleeve over the conduit end. Attach head "B" on opposite conduit.

TYPE "PBW"

2. Simply pull cables, loop and feed back into oversize sleeve. Slide head "A" with sleeve into position and screw sleeve into head "B". Tighten set screws to lock "A" in position.

O.Z. ELECTRICAL MANUFACTURING CO., INC.

262 BOND STREET • BROOKLYN 17, N. Y.

Sales Office and Warehouse: 406 So. Cicero Avenue, Chicago 44, Ill.
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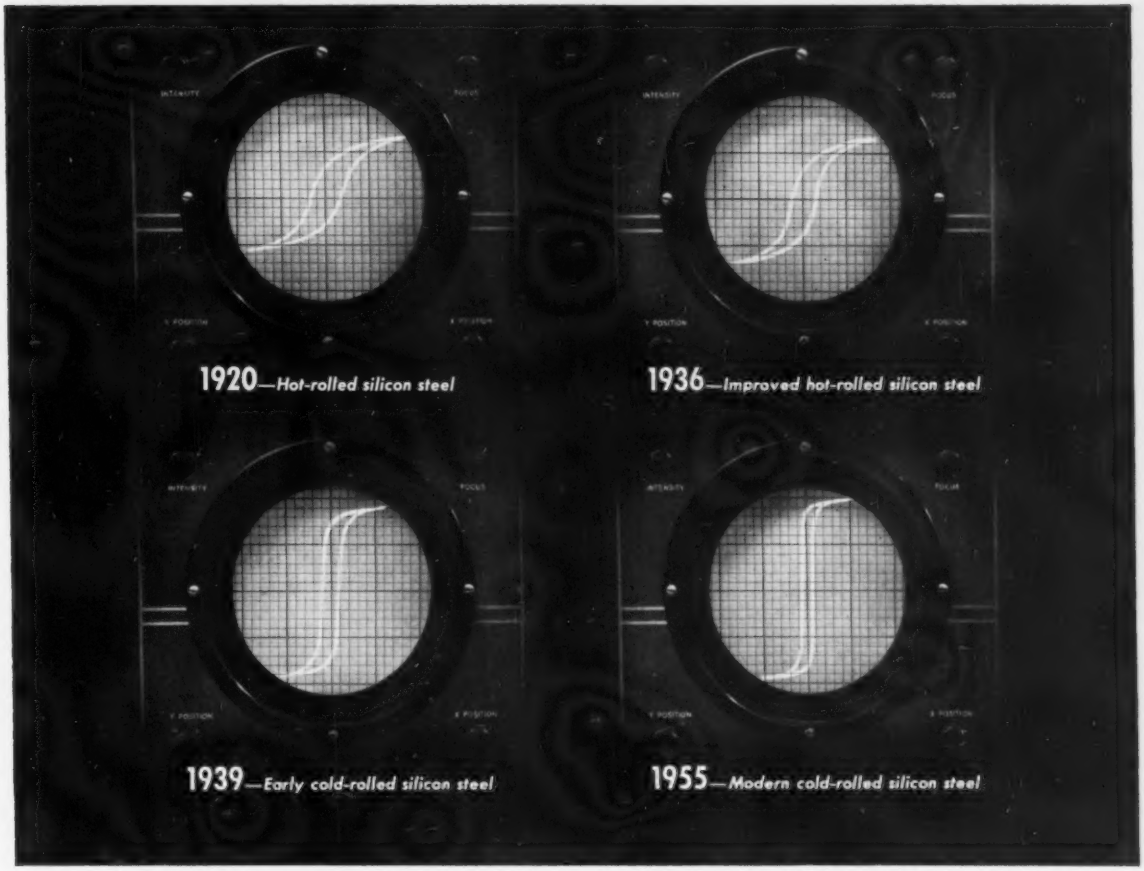
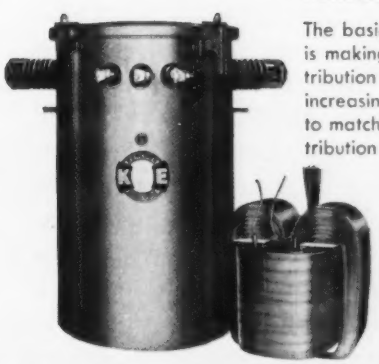
CAST IRON BOXES
CABLE TERMINATORS
POWER CONNECTORS
SOLDERLESS CONNECTORS
GROUNDING DEVICES
CONDUIT FITTINGS



The flux-current loops shown above illustrate the continuous improvement of core steel quality. Developed prior to cold-rolled grain-oriented silicon steel, the ideally constructed KUHLMAN Bent Iron Core has been able to take full advantage of every improvement in core steel.

The KUHLMAN Idea That Is *STILL* Making Transformer History



Transformer research was in its infancy in 1929—the year KUHLMAN pioneered the revolutionary Bent Iron Core. Considered the greatest single achievement in modern distribution transformer development, the KUHLMAN core is still making history.

The basic KUHLMAN bent iron core design is making possible today's lightweight distribution transformers . . . and today's increasing pole mounted transformer KVA to match the load increase of growing distribution systems.

KUHLMAN, with a record of more than 60 years of research and product development, has made many lasting contributions to the electrical industry. Today, with research facilities never dreamed of in 1929, KUHLMAN continues to give you and your customers the benefits of advanced transformer design.

We invite you to ask your KUHLMAN representative, or write direct, for KUHLMAN KURRENTS, Vol. 31, No. 2, which contains the exciting story of modern KUHLMAN research.

HOUSEPOWER HELPS YOU LIVE BETTER ELECTRICALLY — LIVE BETTER ELECTRICALLY

KUHLMAN
ELECTRIC COMPANY

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A fact for every electric utility

FROM COLD RESERVE TO FULL LOAD IN 60 SECONDS

Impossible? Not at all. For this is a characteristic of Electro-Mobile Power. From a cold start a 1000 kw unit can deliver its full load *in less than sixty seconds.*

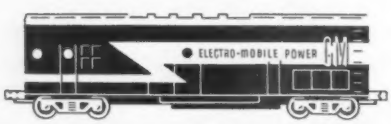
This is true of one or one-hundred units, 1000 kw or 100,000 kw—steady full-load power in far less time than required by any other prime mover, except a spinning unit.

But spinning reserve is *costly* reserve. By letting Electro-Mobile Power supply reserve requirements you not only eliminate running losses, but investment per kilowatt is lower. Efficiency of present stations will improve, too, because generators can be run at a higher load factor.

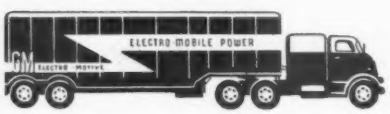
Further, by placing Electro-Mobile Power at the points of load, transmission loss is reduced and less reserve is required to maintain service. Another advantage: EMP units are available with impulse starting or stopping which permits unattended operation from any location.

How might a multi-megawatt system of Electro-Mobile Power units apply to your system? We'd like an opportunity to sit down with your engineers and discuss it. Contact your Electro-Motive representative, he has the details.

Increased demand of 5000 kw at central station picked up in less than 60 seconds by four 1000 kw Electro-Mobile units.

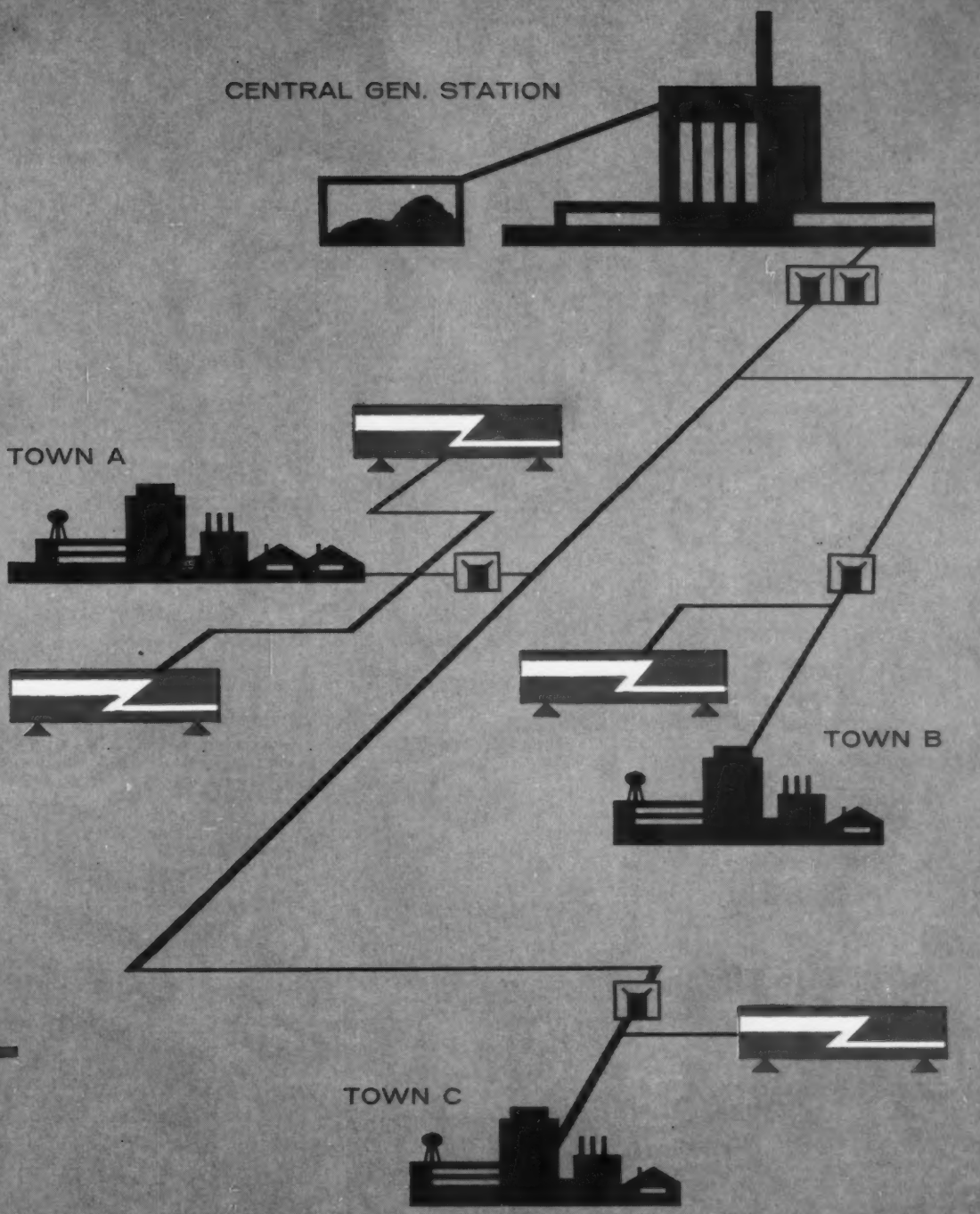


RAIL CAR—1000 kw units for use on sidings or placed on piers for semi-permanent use.

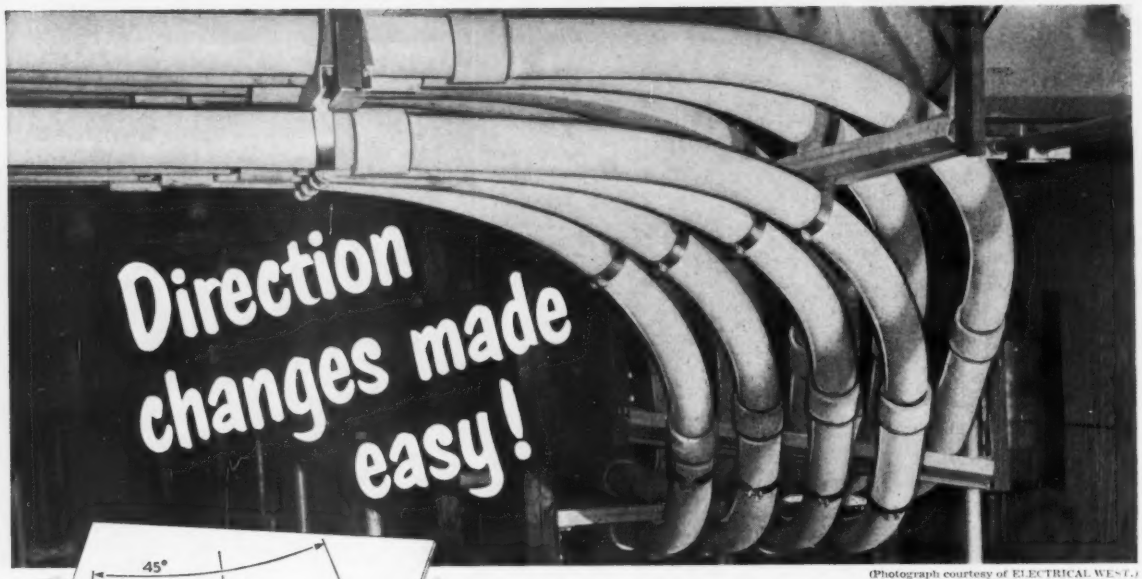


TRUCK TRAILER—500 kw units offer excellent mobility for many temporary applications.

This simple diagram suggests how Electro-Mobile Power located at points of load can effectively reduce reserve requirements and costs. Assuming a 1000 kw line loss at time of peak from the central station, only four 1000 kw EMP units are needed to pick up a 5000 kw demand. Naturally, line loss will vary according to the make-up of the system. However, an analysis of your peak line losses will show what savings can be expected.

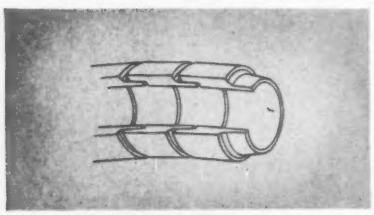


ELECTRO-MOTIVE DIVISION
GENERAL MOTORS LA GRANGE, ILLINOIS
Sales Offices in Chicago, New York, St. Louis, San Francisco



(Photograph courtesy of ELECTRICAL WEST.)

. . . with standard fittings for TRANSITE asbestos-cement DUCTS



5° bend segment sketched in detail. It consists of a straight section of Transite stock with a male taper on one end and a female taper on the other . . . each machined at an angle of 2½° to the center axis. Segments can thus be used single, or combined to form bend sections whose curvature is any multiple of 5°.

When you use Transite Ducts, you have available a wide variety of standard fittings, made of the same asbestos-cement material as the ducts themselves. These fittings save time and expense because they provide maximum flexibility in laying out or constructing a duct system. They facilitate clearing unexpected obstructions or accommodating revisions in the original layout.

For instance, the new Transite 5° Bend Segments (shown at left) can be used alone to form simple and complex curvatures of any multiple of 5°. Used with other standard Transite curved fittings, they form curvatures of odd degrees. Thus, they enable you to simplify cross-overs and transformations . . . to clear obstructions . . . to form unusual or special bend or offset sections. They eliminate the need for purchasing special radii bends or sweeps.

The other standard Transite fittings that facilitate directional changes are the offset bends, standard 45° and 90° bends, sweeps, curved segments, laterals, tees, elbows and deflection couplings. These fittings are machined to a standard taper so that they can be used with Transite Conduit, Transite Korduct or with other Transite fittings.

For more information, write Johns-Manville, Box 14, New York 16, N. Y. In Canada, address 199 Bay Street, Toronto 1, Ontario.

Photograph showing use of bend segments and curved segments with Transite Ducts.

5 OTHER REASONS WHY TRANSITE DUCTS DO A BETTER JOB AT LESS COST:

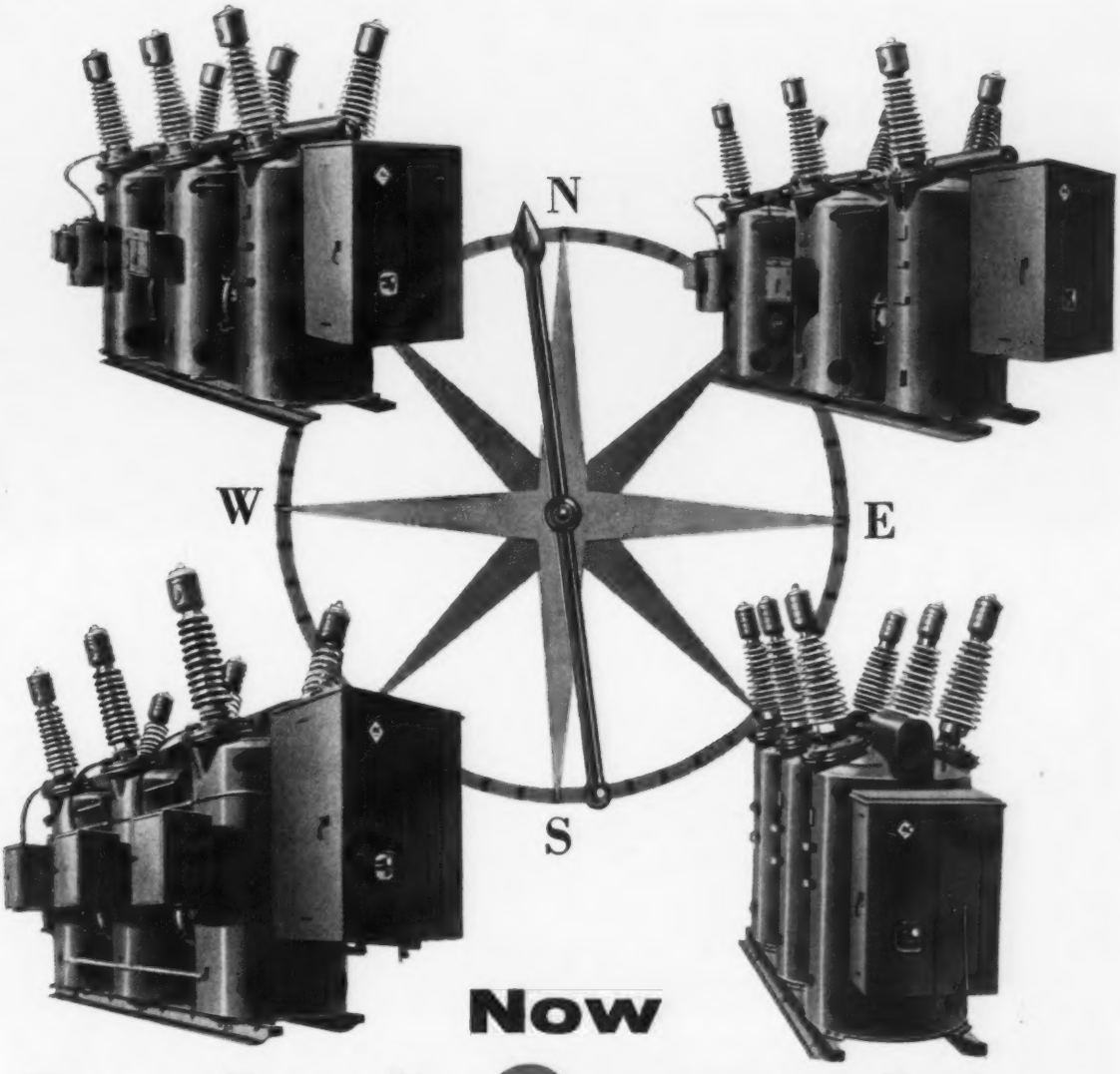
1. **Corrosion-Resistant.** Transite, being made of inorganic asbestos and cement, resists corrosion and is immune to electrolysis.
2. **Permanently Smooth Bore.** Transite makes long cable pulls easy, under any conditions. Danger of damage to cables is also minimized.
3. **Incombustible.** Transite will not burn or contribute to formation of smoke, gases, fumes. It confines burnouts, will not soften under heat.
4. **Higher Thermal Conductivity.** Cables run cooler in Transite, reducing I^2R losses, increasing current capacity and prolonging insulation life.
5. **Easy to Install.** Transite Ducts are light weight, easy to handle. Joints are quickly made. Long 10-foot lengths reduce number of joints in line.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville TRANSITE® DUCTS

TRANSITE KORDUCT—for installation in concrete

TRANSITE CONDUIT—for exposed work and installation underground without a concrete encasement



Now *Pneu-Draulic* Operators

used on ~~30~~ 39 Power Systems

In the last six months, 9 more power systems have installed Allis-Chalmers hydraulically operated circuit breakers.

This is remarkable acceptance and it's due to several reasons. *Pneu-Draulic* operators are both simple and reliable . . . and they eliminate such common operating problems as moisture, condensation, dust and dirt.

Repeat orders are growing, too. This in itself is proof of the excellent performance of breakers with these operators under a wide range of field conditions.

Isn't it time you try an Allis-Chalmers breaker with *Pneu-Draulic* operator on your system?

Get information from your nearby A-C office or write for Bulletin 71B7942. Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

Pneu-Draulic is an Allis-Chalmers trademark.

ALLIS-CHALMERS

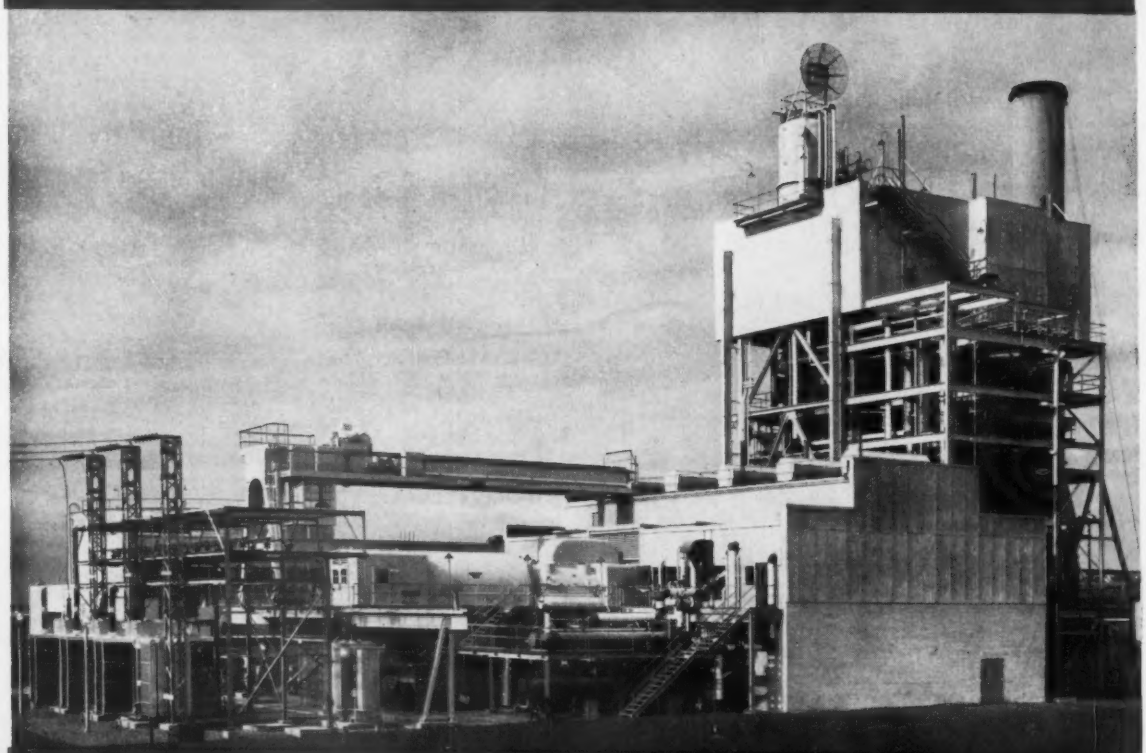
A-4972

POWER AHEAD OF NEED

The new Humboldt Bay Steam Plant marks another forward step for Pacific Gas and Electric Company. It is part of an expansion program which is tripling the company's capacity, providing an abundance of low cost electrical power vital to Northern California's growth and prosperity.

The plant incorporates the latest advances in design and operation. Its 50,000 kilowatts of steam-generated electric power — and an additional capacity of 50,000 kilowatts in a second unit now under construction — supplement power from the interconnected P.G.&E. system which serves Northern and Central California.

With the close cooperation of P.G.&E. engineers, the plant was designed and constructed by Bechtel. *It illustrates an outdoor plant in a size range suited to the needs of many areas — a type of project in which Bechtel is keenly interested.*



BECHTEL CORPORATION

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CONTROL EFFICIENCY and flexibility are typified by this modern control room at the Potomac River Station. Controls are set up for five turbine-generator units. Left to right: Potomac Electric Power Company's Steam Production Superintendent, W. J. Robinson; Electrical Engineer, D. F. Hughes; and Chief Operator, E. A. Howard, discuss panel arrangement.

PEPCO's 5th General Electric unit at Potomac Station helps meet area's growth

Estimates of the population increase in the Potomac Electric Power Company's service area show a 20% rise since 1950. This was the third highest rate of growth among the 15 metropolitan areas with a population of over one million in the United States. And, growth in the Washington area has given every indication of continuing.

Pepco's System Planning Division has an unusual record of accurate forecasts, and has matched its prediction with balanced expansion programs. Pepco has spent over $100,000,000 since 1950 on construction and expansion. This five-year construction and expansion program reached a high point in 1956 with the delivery of a third 90/100,000-kw General Electric turbine-generator. By specifying General Electric equipment, Pepco and its consultants, Stone and Webster, benefited from General Electric power plant services . . . saving time, money and manpower.

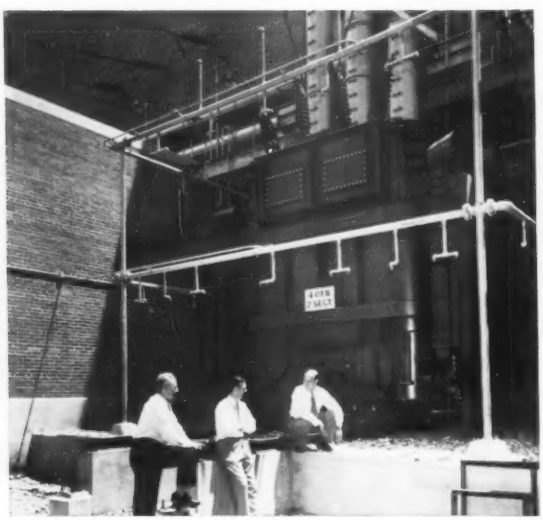
FOR MORE DATA TURN PAGE ▶

GENERAL ELECTRIC

POWER PLANT SERVICES REPORT

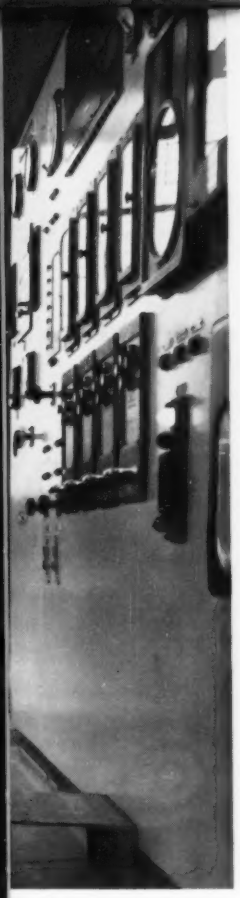
INCREASED CAPACITY for growing load will be provided when unit no. 5 is installed early next year at Potomac River. Unit 5, as well as units 3 and 4 (the one shown here), is 90/100,000-kw reheat turbine-generator with steam conditions of 1800 psig, 1050 F/1000 F. Shown above are L. W. Cadwallader, Pepco Mechanical Engineer; H. J. Sykes, Vice President, Stone & Webster; and W. J. Robinson, Potomac Electric's Superintendent of Steam Production.

PEPCO'S latest 90/100,000-kw G-E unit

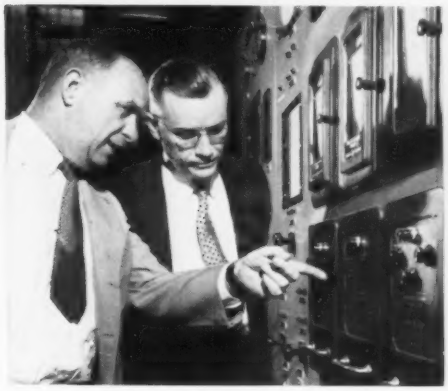


LOWERED INSTALLATION COSTS and on-time delivery of vital equipment like this G-E 90,000-kva power transformer are assured by General Electric power plant services. Another of these units will be installed by Potomac Electric Power Company shortly at the Potomac River Station.

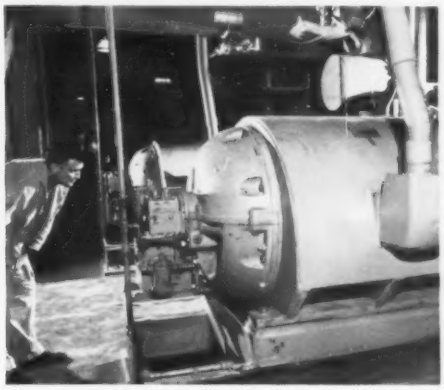
SERVING SUBMARINE CABLE carrying power under Potomac River to Washington, D.C., are these General Electric 69-kv, 2,500,000-kva oil circuit breakers. Discussing switchyard layout are Potomac Electric Power Company's D. F. Hughes, Stone & Webster's H. I. Stewart, G.E.'s F. B. Crider.



PLANNING INSTALLATION of unit no. 5 is a joint endeavor. Here, H. J. Sykes, Vice President, Stone & Webster; D. F. Hughes, Electrical Engineer, Pepco; H. I. Stewart, Construction Superintendent, Stone & Webster; L. W. Cadwallader, Mechanical Engineer and George Bisset, Senior Vice President, Pepco; F. B. Crider, Sales Engineer, G.E., discuss new equipment.



MORE EFFICIENT OPERATION is achieved by General Electric integrated turbine supervisory panel examined here by F. B. Crider, G.E., and L. W. Cadwallader, Pepco Mechanical Engineer.



ASSURANCE AGAINST OUTAGE is provided by 3 boiler feed pump motors per 80,000-kw nameplate rated unit. Pepco Steam Operator L. D. Noland inspects General Electric 800-hp motors.

will boost Potomac River Station capacity 26%

General Electric Power Plant Services help Pepco and Stone & Webster realize lower first costs, higher operating efficiency

Long-range planning at Pepco plays a vital part in determining what steps should be taken to accommodate future growth. The units now in operation at the Potomac River Station are the result of such planning. In 1949-50, two General Electric 80,000-kw nameplate-rated units were installed. By March, 1956, two more of 90/100,000 kw each were operating. Early next year, the fifth General Electric unit at Potomac River will go on the line, bringing the total capacity of the five General Electric units to a nameplate rating of 430,000 kw.

General Electric engineers worked closely with Pepco and Stone & Webster to integrate the design and installation of equipment for optimum station operating efficiency. The same co-ordinated effort will hasten start-up time on unit no. 5 and help keep installation costs to a minimum.

Such application engineering on new equipment is just one of the many power plant services at work on your job when you or your consultants order General Electric apparatus. Product development engineering, field service engineering, and project coordination also help to:

Simplify ordering of equipment purchased either directly or through your consulting engineers, or through a machinery manufacturer.

Conserve engineering time by assisting with electrical equipment details, thereby freeing you and your consulting engineers for other urgent problems.

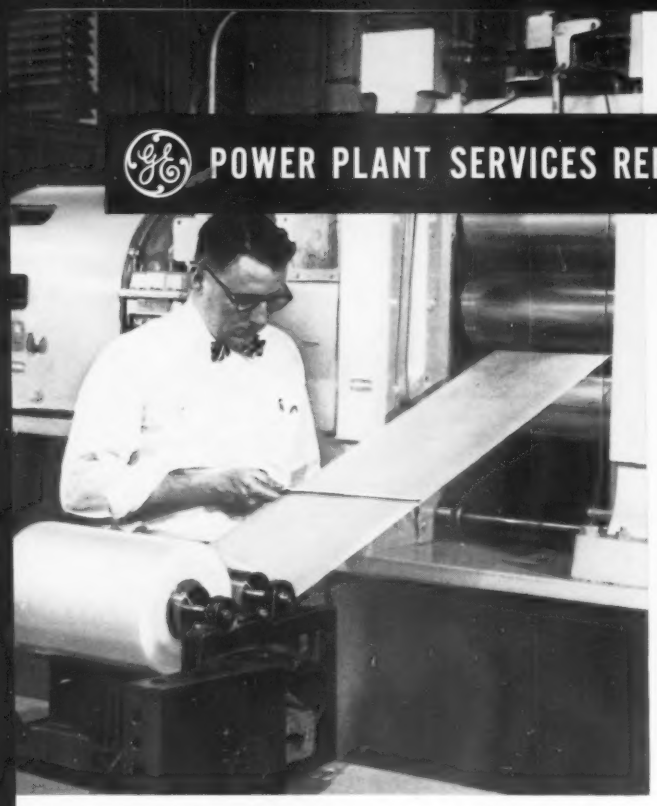
Integrate equipment design with consultant's plant design to assure the maximum flexibility and effectiveness of operation.

Speed construction by scheduling the arrival and disposition of equipment for maximum installation efficiency and on-time start-up.

Assist in training operators to better understand the full operating capabilities of the equipment.

For details, contact your General Electric Apparatus Sales Representative. General Electric Company, Schenectady 5, N. Y. 302-13

GENERAL ELECTRIC



INCREASED RELIABILITY of steam turbine-generators is achieved through improved insulations such as Micapal, which has improved dielectric properties, thermal conductivity and tensile strength. This is typical of G.E.'s continuing research in all types of apparatus for the utility industry.

REDUCED FUEL and man-hour requirements have been made possible with G.E.'s new Automatic Dispatching System, a load frequency control system providing immediate and continuous meeting of load, permitting most economic generation by loading all units to equal incremental costs.

New General Electric product developments help utilities lower operating costs

A multitude of products of wide variety are constantly in development in General Electric's laboratories. Two such advances that have recently emerged from laboratory to useful application are the fully automatic load dispatcher and Micapal insulation. Both these products give excellent promise of lowering utilities' operating costs.

Tireless programs of research, development and product improvement are always under way at General Electric. These programs encompass work on turbine-generators, switchgear, transformers, motors, controls, instruments and other electrical apparatus vital to power plant operation. The goal of this work is to provide the electric utilities with practical means of overcoming rising system costs.

RECORD EXPANSION INVESTMENT

How far will this program go? The answer is dramatically illustrated by the fact that General Electric's record $165 million investment earmarked for expansion of laboratory and manufacturing facilities during 1956 is well on the road to fulfillment.

TEAMWORK IN PLANNING STAGES

As the trends in power station equipment continue to require higher ratings, improved efficiencies, and even greater reliability, the advantage of selecting General Electric apparatus, compounded with time-saving, money-saving benefits of General Electric engineering teamwork, offers electric utilities a striking example of why it pays to call in General Electric early in your planning.

LIVE BETTER ELECTRICALLY

MORE POWER TO AMERICA

GENERAL ELECTRIC

When You Have to Buy Space with Profits . . .

OCT-O-DUCT IS YOUR DOLLAR'S BEST FRIEND

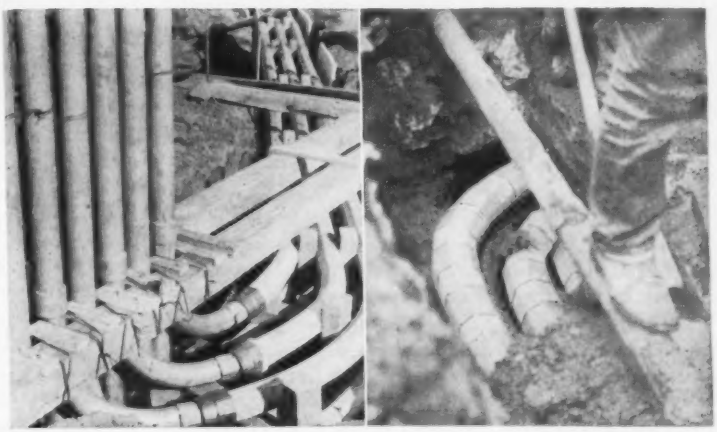
It's easy to lay any underground conduit in a wide, spacious trench, where long, straight runs and sweeping curves match the builder's fondest dreams.

But when the going gets tough—over and under existing underground services, under busy thorofares, around sharp bends—then's the time you're glad Soapstone OCT-O-DUCT is *on the job.*

OCT-O-DUCT's easy-to-handle 4-foot lengths, unique coupling design, and simple spacing blocks combine to protect your profit margin by reducing installation man-hours.

The pictures here, showing installations in Castro Valley and San Francisco, tell the story short and sweet: OCT-O-DUCT *is fastest and easiest to install.*

OCT-O-DUCT's many other money-saving features are described in our new catalog Bulletin 56-A, which gives complete specifications, and in Bulletin 54-B, our Manual of Field Practices. Write for your free copy of either or both publications.



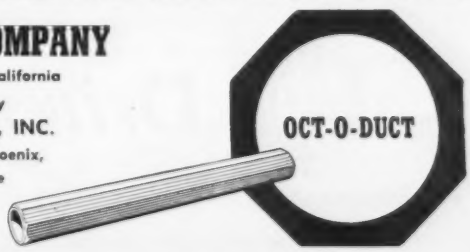
SOAPSTONE DUCT COMPANY

3985 Beach Street, Oakland 8, California

Distributed in the West by

MAYDWELL & HARTZELL, INC.

San Francisco, Los Angeles, Phoenix, Portland, Seattle, Spokane



At this stage, #113 is just a number. If all proceeds as planned, it will shortly acquire a name — the name of Driver-Harris's newest special-purpose alloy . . . made, as always, to meet the needs of a specific manufacturer.

When someone asks us for an alloy we do not have, we try to make it. Usually we succeed. To date we have succeeded 112 times. Many of our long line of electrical, electronic, and heat-resistant alloys — Nichrome*, Nichrome* V, Advance*, Karma*, Manganin, Nilvar*, and the rest — are today famous names in industry the world over. And each of these was originally custom-made . . . produced exactly to the specifications of someone who needed it.

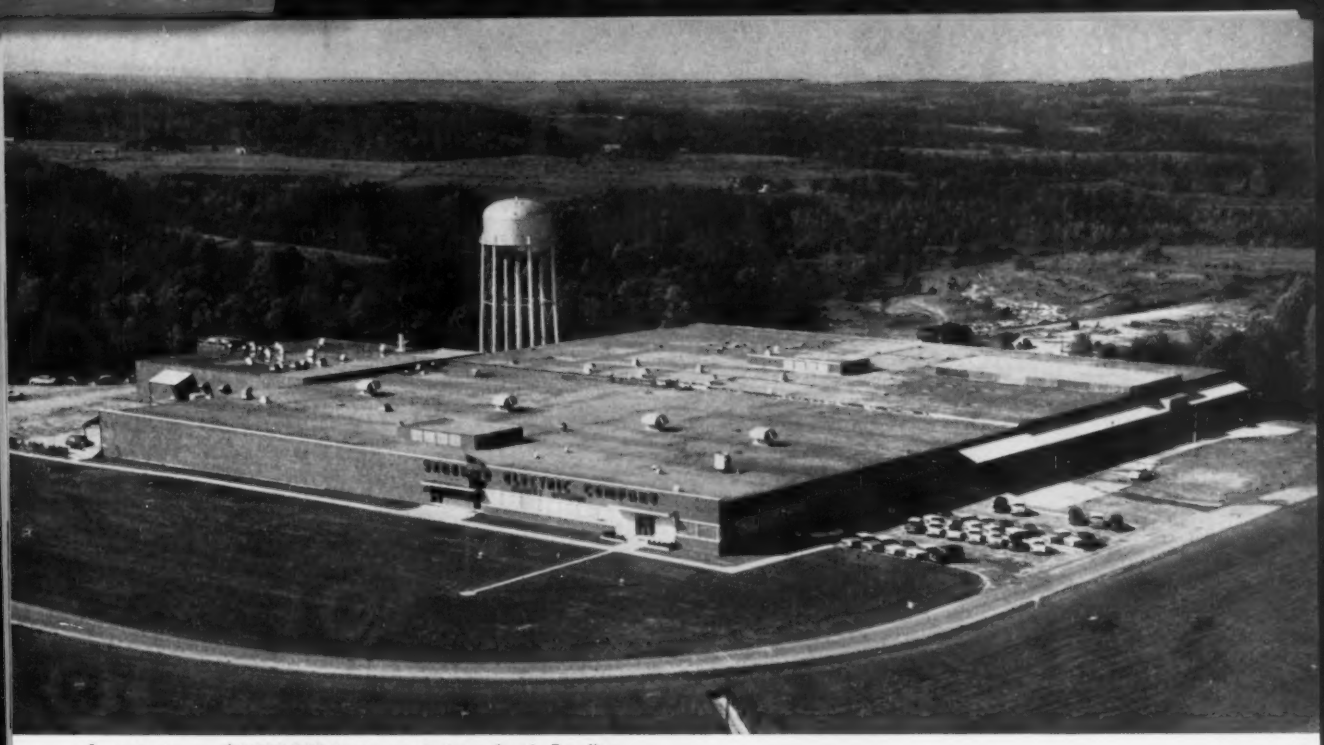
Are you in need of an alloy with special properties, not yet available? Put your specifications in our hands. You will gain the benefit of the 57 years of experience which has developed the largest variety of alloys ever made by any one company.

*T.M. Reg. U. S. Pat. Off.

Driver-Harris COMPANY HARRISON, NEW JERSEY

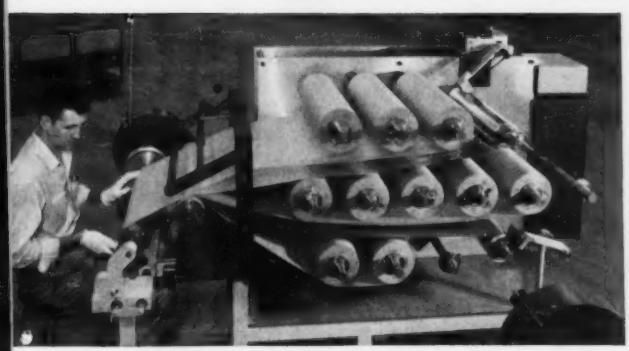
Western Representative: ANGUS-CAMPBELL, INC. • 4417 S. Soto St., Los Angeles 58 • 760 Tennessee St., San Francisco 7

MAKERS OF THE MOST COMPLETE LINE OF ELECTRIC HEATING, RESISTANCE, AND ELECTRONIC ALLOYS IN THE WORLD

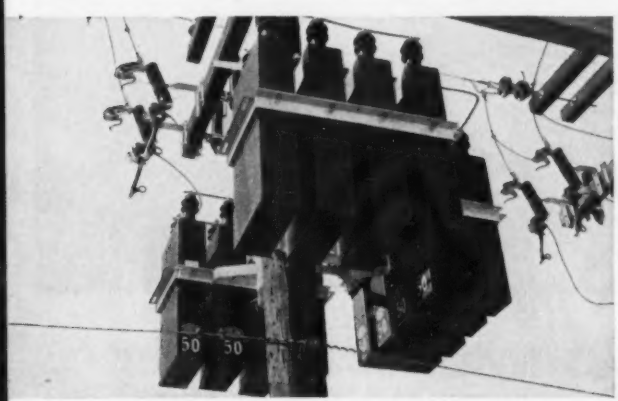


Sangamo's new $5,000,000 factory in Pickens, South Carolina supplements the Illinois facilities for capacitor production.

New Sangamo Plant speeds production of SANGAMO POWER CAPACITORS



Capacitor sections of kraft paper and pure aluminum foil are wound under controlled atmospheric conditions.



This cluster mount of 12 Sangamo 50 Kvar Capacitors is part of a bank installed at a Texas substation.

Now, Sangamo's expansion program provides another modern plant for increased production of Sangamo Power Capacitors to help meet the demand created by the nation's growing power load.

Sangamo Capacitors are built to power engineers' specifications. Step-by-step quality control of raw materials and fabrication and rigid inspection—all combine to produce the highest quality capacitors.

They're available in 15, 25 and 50 Kvar units, in all primary voltage ratings and in factory-assembled and wired Auto Var equipment for pole-type installation. Auto Var equipment, with or without switches, can be furnished for standard in-line or multi-row mounting, or to meet special installation requirements.

Sangamo also manufactures Time Switches and Lincolntrols for automatic capacitor control as a function of time, volts, amperes, watts, or vars, or as combinations of these functions.

Ask your Sangamo Representative, or write us for full information today.

SANGAMO
ELECTRIC COMPANY
Springfield, Illinois

PC56-6

John Harrell, Manager Voltage Regulator Sales, points out that URL-16 feeder regulator with new CVR relay and instant-response Geneva gear tap changer combine to offer superior regulation with less maintenance.

Westinghouse 16-step regulation means you carry greatest load, produce most revenue

URL-16 with new CVR relay performs three exclusive functions:

1. FASTER CORRECTION OUTSIDE SET BANDWIDTH

The new CVR relay designed with inverse time characteristics actually evaluates the need for speed of response . . . steep voltage variations are corrected more quickly than gradual voltage changes. Result —a narrower effective bandwidth.

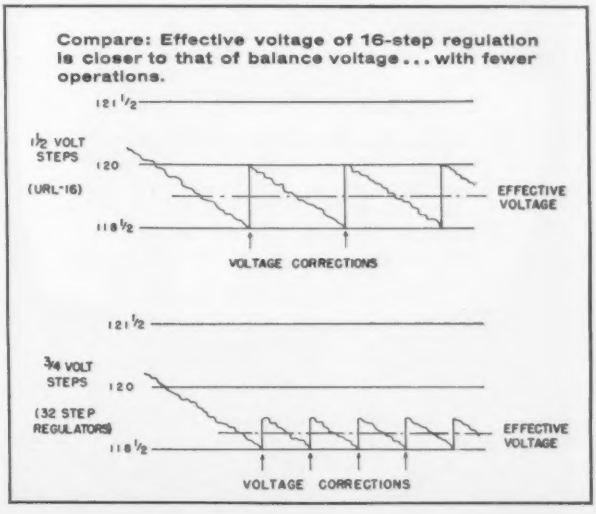
2. INSTANT-RESPONSE TAP CHANGING

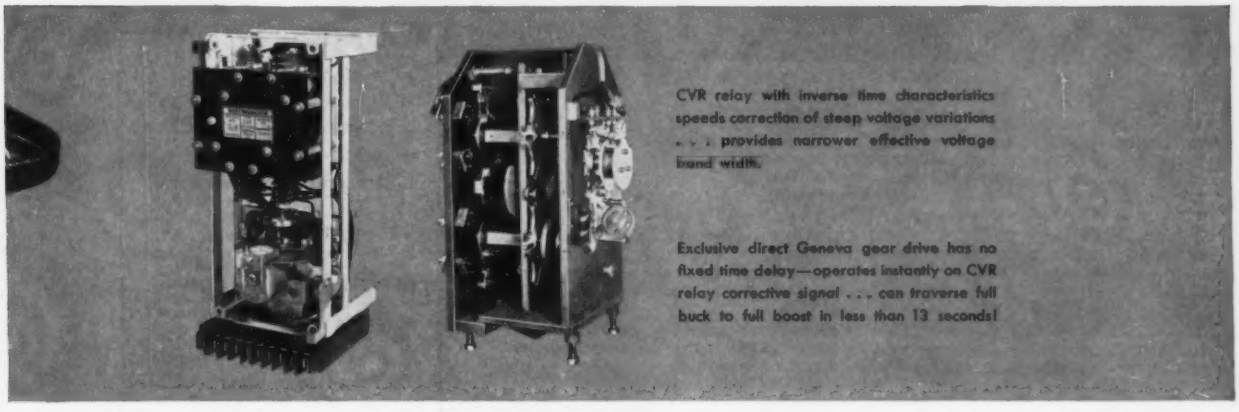
Because of direct Geneva gear drive there is no fixed time delay between relay and tap-changer operation. Tap changer operates instantly . . . can traverse full buck to full boost in less than 13 seconds!

3. 16-STEP REGULATION

The exclusive URL-16 with 1½-volt steps corrects exactly to balance voltage on a 3-volt bandwidth bringing the effective voltage nearer to this level. Similarly, the higher correction on 2-volt or greater bandwidth results in effective voltage closer to the desired level. URL-16 slashes number of corrective operations by 42%, contacts erosion 15%. Result—substantial savings in maintenance.

A narrower effective bandwidth means you can put more load on your system . . . get more revenue for power delivered. Specify new Westinghouse URL-16 regulators on your system. J-70779-X




CVR relay with inverse time characteristics speeds correction of steep voltage variations . . . provides narrower effective voltage band width.
Exclusive direct Geneva gear drive has no fixed time delay—operates instantly on CVR relay corrective signal . . . can traverse full buck to full boost in less than 13 seconds!

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING FOR **YOU**!*

Familiar symbols of safety

PROTECTION IN THE AIR

FOR YOUR
WIRING PROTECTION

Standard-threaded rigid steel conduit is the only wiring system approved today by the National Electrical Code as moisture-, vapor-, dust- and explosion-proof for use in hazardous locations and occupancies.

Youngstown Buckeye full-weight rigid steel conduit is the answer to all problems of safe and efficient functioning of your electrical wiring systems in any type location. On the job, you will find it's easier to fabricate—easier to fish wires through—and above all, Buckeye Conduit will save you money because its excellent corrosion resistance always provides a much longer, untroubled service life.

Remember, because Youngstown is the only producer of rigid steel conduit controlling all processes from ore mining to bundling the finished product, you can be certain each length contains the same high quality that has made it the accepted standard of owners, architects and contractors everywhere.

Ample stocks of our distributors will keep your jobs on schedule—and cover emergency needs whenever they arise. Call today for that famous quality and service built into every Youngstown product.

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices - Youngstown 1, Ohio
District Sales Offices in Principal Cities

QUALITY YOUNGSTOWN SERVICE

Ask your distributor for Youngstown Buckeye Full Weight Rigid Steel Conduit and Youngstown Electrical Metallic Tubing.

"I'll be right down, Joe... These PLP DEAD-ENDS are a cinch to install"...

Installation of a PLP Dead-End is no trick at all. It's fast and it's done right the first time, by hand. No need to recheck later.

The resulting installation is neat . . . safe . . permanent.

The streamlined appearance speaks for itself. Safety is assured because there are no sharp edges, no concentrated stress or fatigue point.

A speedy installation, and trouble-free service are reasons why linemen prefer PLP Service Entrance Dead-Ends. Call a PLP Representative today, ask for a demonstration.

PX-76

Made in accordance with or for use under U S Patent No 2,761,273, other patents pending

PLP

PREFORMED LINE PRODUCTS COMPANY

5349 St. Clair Avenue Cleveland 3, Ohio

TELEPHONE: CLEVELAND EXPRESS 1-3571

***ONLY* ON THE GENERAL ELECTRIC *I*-55 METER:**

$4.77 CAN BE

Tests, service prove General Electric I-55 meters can save you money

For complete details on how I-55 meters can save you money, call your nearby G-E Apparatus Sales Office. For information on the complete line of General Electric watthour meters, write Section 621-10, General Electric Co., Schenectady 5, N. Y.

GREATER SUSTAINED ACCURACY

New test data on meter performance, compiled in G-E research laboratories, prove that General Electric's revolutionary "floating disc" meter provides high sustained accuracy which saves you money.

During accelerated life tests, identical loads were applied to the G-E I-55 meter and to meters with conventional bearing systems. The results are startling.

Here's the proof. Assume an average

GREATLY REDUCED TILT ERROR LOSSES

Any meter operating at even a slight tilt will give inaccurate readings that often result in loss of revenue. General Electric lab tests prove that I-55 meters with magnetic suspension "floating discs" are least affected by tilt—while the accuracy of meters with conventional ball bearing systems varies considerably with different angles of tilt.

Here's the proof. A conventional meter at one degree forward tilt, operating at a continuous average of 240 volts, 1.5 amperes, would lose .01728 kwhrs

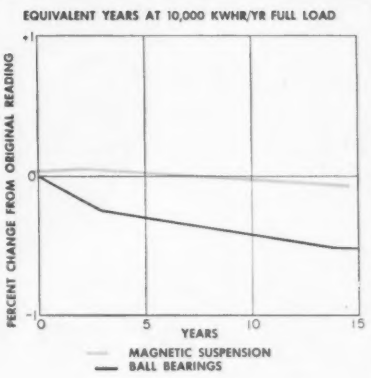
NO PERIODIC BEARING REPLACEMENT

TOTAL FIFTEEN-YEAR

GENERAL ELECTRIC

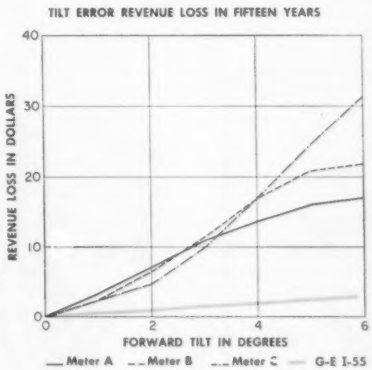
SAVED IN JUST 15 YEARS

kwhr usage per consumer (based on *Electrical World* forecasts) per year for fifteen years and the per cent loss on registration per year—the total loss in kwhrs would be 266.8 for a conventional meter. At two cents per kwhr, this means a gross loss of $5.34. By considering the "present worth" factor at 6 per cent interest for each year, the net loss on a conventional meter would be $3.14. The I-55 eliminates this loss and saves you the money.



$3.14

registration over the I-55 in 24 hours. In 15 years, the kwhr loss would be an amazing 94.40 kwhrs. Taking a reasonable figure of two cents per kwhr, the gross loss would be $1.89. By considering the "present worth" factor at 6 per cent interest for each of the fifteen years, the conservative saving realized by using a General Electric I-55 meter would be $1.29. And a glance at the chart on the right reveals much higher savings at tilt errors of 2 degrees to 6 degrees.



1.29

The trouble and expense of periodic bearing replacement is eliminated when you use General Electric I-55 meters with the "floating disc."

General Electric accelerated life tests prove that ball bearings in ordinary meters must be inspected and in many cases replaced after a comparatively short period of time. The G-E I-55 meter with magnetic suspension—and no bearings—showed no measurable wear even after the equivalent of more than 300 years of normal operation.

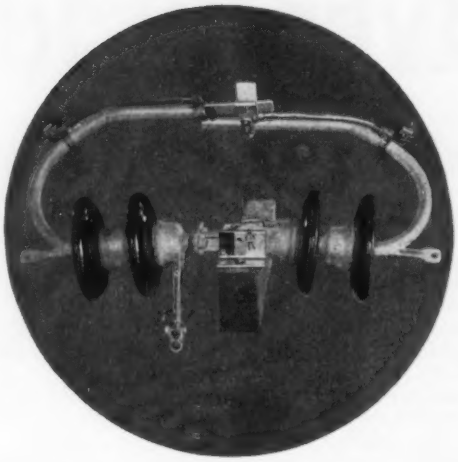
Bearing replacement is costly. Here's a typical example. Assuming replacement occurs after fifteen years' service, and taking into account an estimated average replacement cost and the "present worth" factor at 6 per cent interest, a conservative cost for bearing replacement on each conventional meter would be 34 cents. With no bearings to replace on the I-55 you save 34 cents on every meter.

.34

AVERAGE SAVING USING I-55 METER $4.77

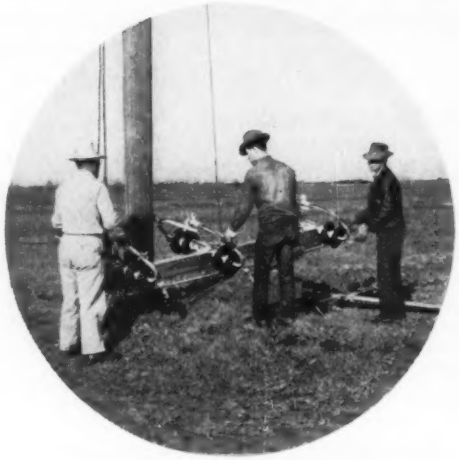
With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

You can install KPF switches more quickly, at less cost, than any comparable switch. Just bore six holes in a single cross arm, mount, and connect. No precision requirements, no temperamental mechanism to bind, freeze, malfunction or need lubrication. Just simple, cleanly designed parts, arranged in a rugged, foolproof manner for trouble-free operation. The economy and dependability of KPF switches has been proved on major utility systems for almost 50 years.



install in the air — or on the ground

Mount phase units individually to pre-installed cross arm on the pole top.



Assemble complete switch on the cross arm before arm is installed on pole.

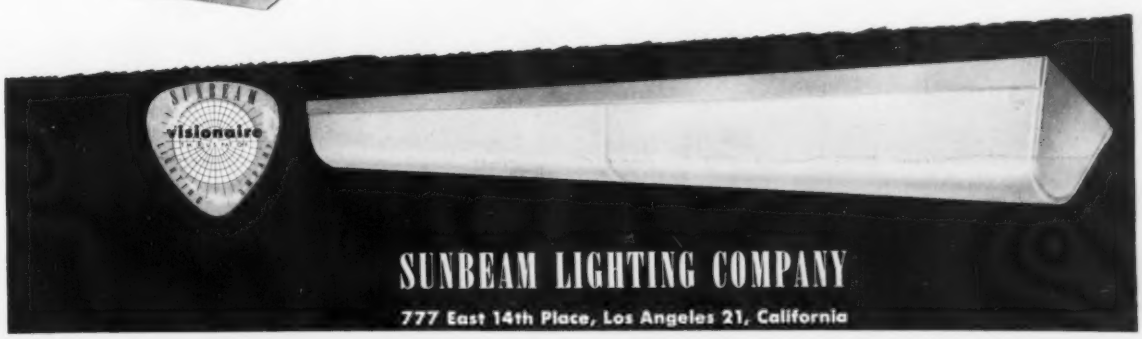
Mount switch and cross arm on pole, then tilt pole into position.

Details in complete catalog. Why not order test installation?

KPF ELECTRIC COMPANY
Dept. W, 1624 E. Alpine Avenue
Stockton 5, California

KPF
AIR BREAK SWITCHES
Standard for nearly half a century

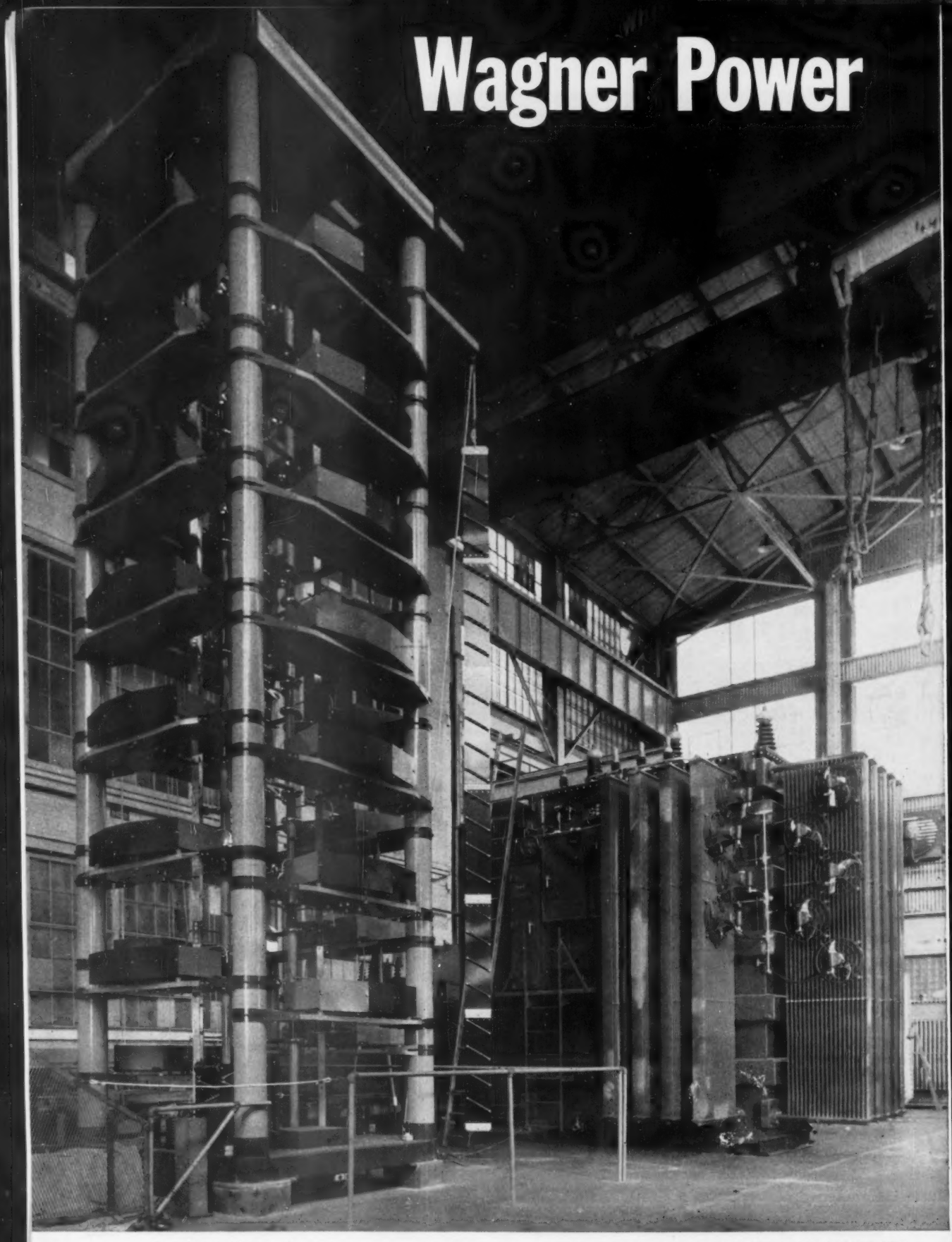
Here is versatile, shielded, single-lamp lighting for more applications than there's space to name with the Sunbeam P2801 Visionaire for corridors, library stacks, small parts bins, stairways, dressing rooms, over murals, paintings and commercial display areas or, as pictured, to form the general lighting system for smart contemporary interiors. Arrange patterns with the matching corner connector for uninterrupted geometric designs; follow contours or mount vertically on walls to provide local illumination. White plastic diffuser presents uniform surface brightness in all directions, snaps in or out with gentle "squeezing" motion. Low, low maintenance and tailored illumination distinction is assured whatever the application. Available in all standard lamp lengths.



SUNBEAM LIGHTING COMPANY

777 East 14th Place, Los Angeles 21, California

Wagner Power



Impulse test being given to a new power transformer in the Wagner transformer plant. The 3 phase, 60 cycle transformer under test is rated 20,000/25,000/33,333 Kva forced air cooled.

Transformers

Designed–insulated–and tested to handle heavy voltage surges for assured power continuity

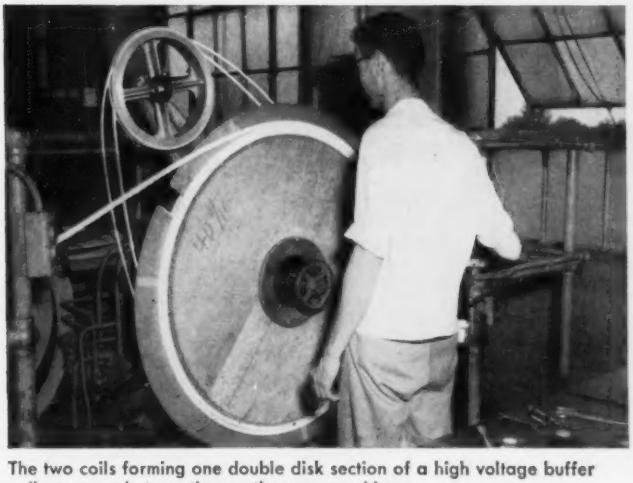
Wagner has been building power transformers for sixty-five years. The knowledge gained and the facilities acquired in all those years make the designing and building of fine power transformers part of the day's work at Wagner.

Wagner power transformers are designed and insulated to withstand practically any lightning or switching surge that might be encountered on a properly protected transmission line.

But, because heavy surges are the greatest enemy of transformer life, Wagner subjects every new design to rigid tests to make doubly sure that these transformers will provide the utmost reliability and service continuity.

Consult Wagner on your next power transformer installation. Thirty-two branches are at your service. Bulletins TU-180 and TU-181 give information on the complete line of dependable Wagner Transformers.

Buffer coils are used at the ends of the high voltage windings for Wagner power transformers. They protect against surges by absorbing the first impact of any line disturbance.



The two coils forming one double disk section of a high voltage buffer coil are wound at one time on the same machine.

The buffer coils have extra cable paper insulation on the conductor. Each section is individually wrapped with insulating tape.

Wagner Electric Corporation
EST. 1891

T56-11

WAGNER ELECTRIC CORPORATION
6381 Plymouth Ave. • St. Louis 14, Mo., U. S. A.

BRANCHES IN 32 PRINCIPAL CITIES

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES • AUTOMOTIVE BRAKE SYSTEMS–AIR AND HYDRAULIC

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- Burndy Engineering Co.
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- Southern Car & Mfg. Co.
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3460 WILSHIRE BLVD. • LOS ANGELES 5, CALIF.
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EXTRA Holding Power
QUICKLY Installed
TOUGH For long life

EVERSTICK ANCHORS

For new construction and maintenance —Everstick Anchors speed up work and provide dependable anchorage on all types of jobs. Made of resilient, rust resistant malleable iron. The toughest anchors made. Write for bulletin.

EVERSTICK ANCHOR CO.
FAIRFIELD, IOWA

INDIANA STEEL & WIRE CO. Crapo Galvanizing MUNCIE, IND.

Signs along the lines of *Crapo* **GALVANIZED STEEL STRAND PERFORMANCE**

For dependable performance . . . insist upon *Crapo* Galvanized Steel Strand. Superior tensile strength, combined with long-life, ruggedness and workability, makes *Crapo* Steel Strand first choice for guys, messenger and overhead ground wire.

The famous *Crapo* galvanizing process provides dependable protection for the steel, prolongs the expectant life of the strand.

- Low maintenance cost
- Laboratory tested and controlled quality
- Meets highest quality standards
- A size and grade for all practical needs
- Contact your *Crapo* Jobber Today!

INDIANA
STEEL & WIRE CO., INC.
Muncie, Indiana

LETTERS TO THE EDITOR

Not for Sale

To the Editor:

I read an article in the October 1956 issue of the ELECTRICAL WEST which stated that the city of Anchorage was considering the sale of its power system to the Chugach Electric Assn., inferring that the sale price would be approximately $1,500,000. It would be interesting to learn the source of the information on which the article was based.

I wish to state that the city of Anchorage is not considering the sale of its property to the Chugach Electric Assn. or to any one else. We have a municipal distribution system that is returning approximately 8% on plant value to the general fund, as a dividend to the taxpayer owner which for the year 1956 was $312,000. In addition it is making a payment in lieu of taxes in the amount of $53,119 for 1956 and making improvements to the system through capital expenditures totaling $405,421, also out of 1956 revenues. These three items total $770,560.

Obviously we would not sell a system which is debt free and making such a substantial return to its taxpayer owners, most certainly not to a Rural Electric Cooperative which does not and will not make any payment in lieu of taxes.

I might add that the existence of the Municipal Light & Power Department has an excellent stabilizing effect on rates. The rates of the Rural Electric Cooperative have recently been reduced to the level of the municipal rates within the city limits due to a minor program of duplication of co-op facilities by the city within the city limits.

I trust that I may see an article in the next issue counteracting the fact information contained in the above-mentioned article . . .

WILLIAM H. MCKINLEY
Superintendent, Municipal Light & Power
Anchorage, Alaska

Wants Another

To the Editor:

The flakes from Snow's Pen are reminders of a great load building era. The boys may have burned a rug here and there but they also left their mark on a lot of pavement. Let us hope that the salesmen of today have developed no fatty tissue in these misleading times.

We want another Snow Storm.

JAMES B. BUMAN, Retired
Pacific Power & Light Co.
Portland, Ore.

The WESTERN STATES and HAWAII represent 20% of your total market for electrical equipment and supplies — For thorough advertising penetration of this rich market there is no better medium than ELECTRICAL WEST, 68 Post St., San Francisco 4, Calif.

wonder where the BUBBLES went?

Visible voids spot the test pour of an improperly-fluxed heat of aluminum.

A typical cross-section of sound, bubble-free Anderson Aluminum test pour.

QUALITY CONTROL from the very start removes any chance of "gas porosity" weakness from

ANDERSON *Aluminum*

SUBSTATION CONNECTORS

TYPE ATTH

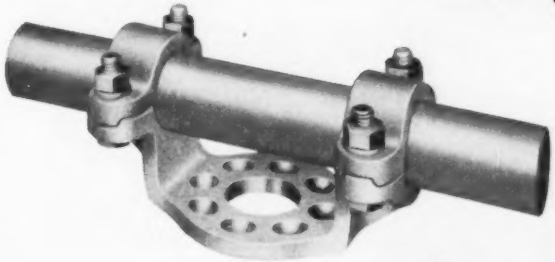
ANDERSON PREDETERMINES LONGER LIFE ... greater efficiency ... and higher tensile strength by putting to work the *probing, fact-producing* experiences of 30 years of Aluminum Connector manufacture.

Insuring "high density" by completely eliminating *pin-hole gas porosity* in aluminum castings is just one of Anderson's check-point measures in the production of connectors of outstanding quality. Every heat of aluminum is checked to guarantee that no connector will fail in service because of *voids* in the casting created by *tiny gas bubbles!*

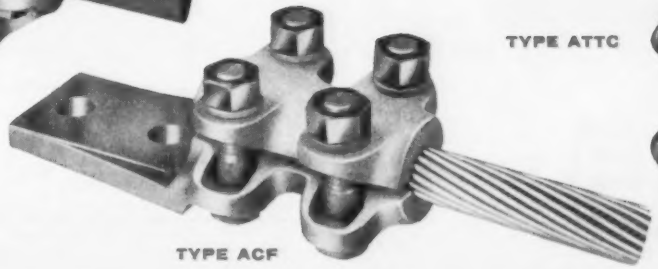
Any Anderson Representative can give you the full, detailed story of our exacting QUALITY CONTROL measures ... consult your nearest Representative or write to the home office.

Aluminum & Bronze POWER CONNECTORS • CLAMPS • FITTINGS • ACCESSORIES
for **SUBSTATION • TRANSMISSION • DISTRIBUTION**

ANDERSON ELECTRIC
CORPORATION
BIRMINGHAM 1, ALABAMA



TYPE AUR



TYPE ACF

TYPE ATTC

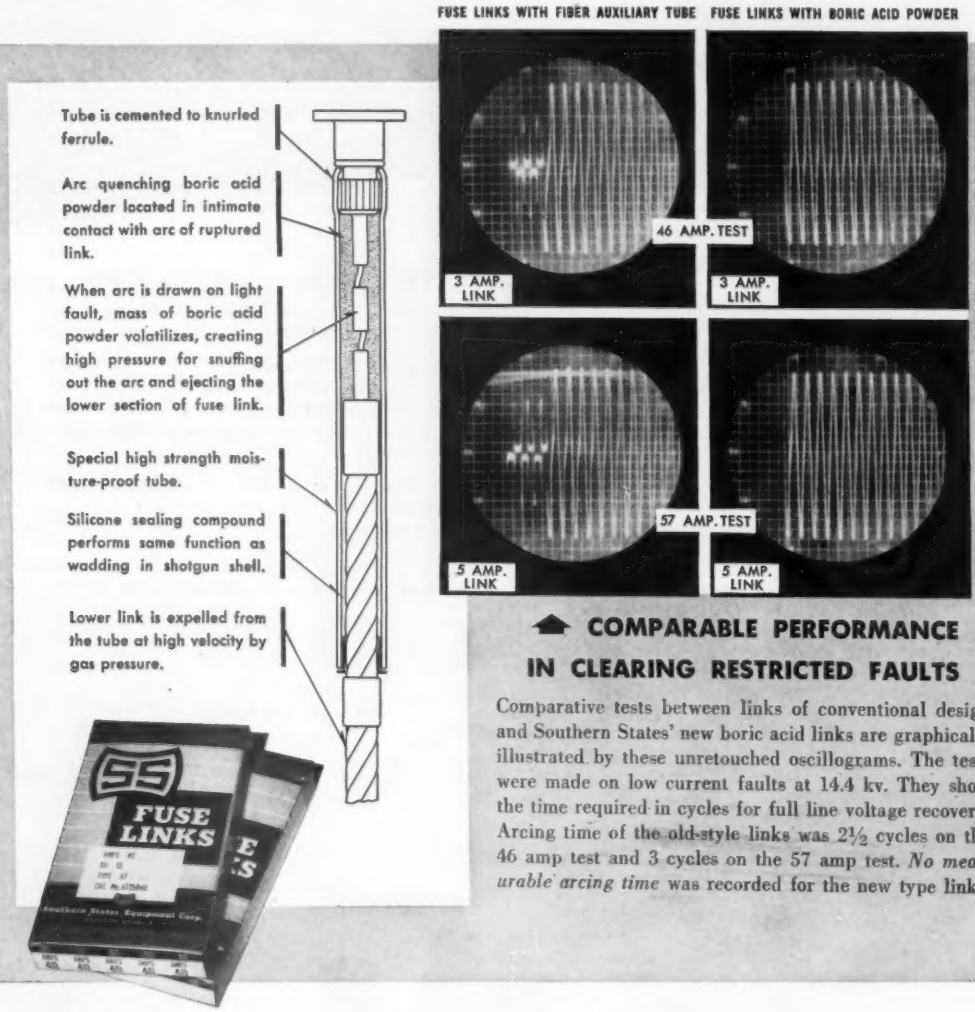
SOUTHERN STATES FUSE LINKS SOLVE PROBLEM OF LOW FAULTS

The problem of clearing restricted faults can be effectively eliminated by using Southern States boric acid fuse links. Even when using large bore cutouts, a low-magnitude fault can be cleared with little arcing.

As the illustration below shows, boric acid powder is in intimate contact with the fusible element. When the link ruptures, the mass of boric acid volatilizes, building a vapor pressure high enough to quench the arc instantly.

The added protection afforded by boric acid links virtually eliminates the possibility of cutout failure when called on to operate in the low current range.

Standard construction features of these links include: silver plating of all external metal parts . . . high-strength crimped joints . . . low-melting temperature elements . . . and moisture-resistant auxiliary tubes. You get a stronger link, more resistant to corrosion, and more dependable than ever.


Tube is cemented to knurled ferrule.
Arc quenching boric acid powder located in intimate contact with arc of ruptured link.
When arc is drawn on light fault, mass of boric acid powder volatilizes, creating high pressure for snuffing out the arc and ejecting the lower section of fuse link.
Special high strength moisture-proof tube.
Silicone sealing compound performs same function as wadding in shotgun shell.
Lower link is expelled from the tube at high velocity by gas pressure.
FUSE LINKS WITH FIBER AUXILIARY TUBE
FUSE LINKS WITH BORIC ACID POWDER
46 AMP. TEST
3 AMP. LINK
3 AMP. LINK
57 AMP. TEST
5 AMP. LINK
5 AMP. LINK
SS
FUSE LINKS

COMPARABLE PERFORMANCE IN CLEARING RESTRICTED FAULTS

Comparative tests between links of conventional design and Southern States' new boric acid links are graphically illustrated by these unretouched oscillograms. The tests were made on low current faults at 14.4 kv. They show the time required in cycles for full line voltage recovery. Arcing time of the old-style links was 2½ cycles on the 46 amp test and 3 cycles on the 57 amp test. *No measurable arcing time* was recorded for the new type links.

SOUTHERN STATES EQUIPMENT CORP.
HAMPTON, GEORGIA

IN CANADA: Dominion Cutout Co., Ltd., Toronto

ELECTRICAL WEST SALES GUIDE © DECEMBER 1956

News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

Field narrows again

With sale of both Crosley and Bendix to Philco the latter moved up into the big five; was listed in a recent *Time* report as third, immediately after G-E and Westinghouse. Avco attributed its sale of the two businesses to increasingly severe competition, price cutting and rising labor and material costs; said it wanted to devote its resources to its profitable and rapidly expanding commercial, industrial, defense and broadcasting operations. It did not sell its Nashville plant; will manufacture Bendix laundry equipment and Philco ranges there, augmenting Philco's operations at its Dexter Division in Fairfield, Iowa. Eventually the line will bear the Philco-Bendix name. Models will be changed one at a time beginning next year. In the West Avco field people were offered positions with Philco. Some had accepted, some were undecided at press time. Distribution will be by **California Electric Supply** (Crosley-Bendix distributor) in northern California and western Nevada; elsewhere on the Pacific Coast by existing Philco distributors. **Edward Rising** is appliance division manager for California Electric. **Bud Schuster** moved over from **Dallman Co.**, former Philco distributor, as appliance sales manager. **Joseph Valenson,** former sales manager, becomes assistant manager of the appliance division. Dallman field representatives also are moving over. **C. E. Lindstrom** is Philco regional manager in the southwest, **George Daum** in the northwest.

Drops one

As it took over the Philco-Bendix distributorship California Electric Supply announced that it would drop the Ben Hur freezer line.

Will close

The attractive display space occupied by Crosley-Bendix in San Francisco's Merchandise Mart, always a drawing card at market time, reportedly will be closed sometime after the first of the year. **Richard Kelly,** Pacific sales manager, had not announced his own plans at press time.

Bows out

Dallman Co. Appliance Division, retrenching after Philco moved to California Electric Supply, will not look for a replacement line to be distributed to retailers, according to Vice-President Verl Taylor. The company will continue to handle appliance lines sold directly to builders and contractors.

Selling center

A showroom demonstration center with built-in selling and display features is being offered to Frigidaire dealers (see picture p 104). Refrigerators, ranges and laundry equipment can be displayed as a family group or separately in three sections. A variety of wall coverings, decorative panels and colors is integrated into the display. Full color interchangeable transparencies in light boxes on each unit help sell features. Easels that are part of cabinet tops unfold to show action-type demonstration cards, which salesmen may use as self trainers or customers to sell themselves. There is a built-in desk for demonstration and closing; there are spaces for literature, order blanks, contract forms and special demonstration materials.

Heat dealers plan drive

Portland Electric Heat Dealers Assn. Inc. was formed recently with nine members. Purpose is to promote electrical heat, revive public confidence in the industry, establish good public relations and bind together all factions directly or indirectly related. A promotional campaign will get under way about Jan. 1. As a kick-off mid-November newspaper advertising showed the group's insignia in color; told readers that members had pledged to adhere to the city electrical code, to BBB advertising ethics, to installation practices recommended by NECA, to power company requirements.

It's here now, RCA says

For the past three months 32% of **Leo J. Meyberg's TV volume has been in color,** Parsh Henry, vice-president, told RCA dealers at a closed-circuit telecast in San Francisco last month. By the end of the year he expects to see it approaching 50%, he said. The telecast, which showed beautiful color, some of it recorded, introduced the RCA-Victor Holiday Harvest of color, Nov. 15-Dec. 31. Backed by a $220,000 advertising budget, the campaign is designed to get across the idea that color is here now; that the price is right and there are plenty of programs. Dealers are being offered plenty of incentives. A free home demonstration offered during the campaign period provides for dealer delivery of the set, which will be set up and maintained by RCA service men for three days at no cost to the dealer if a service contract is sold and a nominal charge if it is not. (72% of home demonstrations result in sales, Henry pointed out.) Leads from a color booklet offer will be turned over to dealers. A film, *The Story of Television*, will be available for group showing. In addition Meyberg offers a home ownership plan for dealer salesmen, field service counseling, rewards for good sales jobs.

New look

Square corners are back. Their return was a natural once the built-in idea caught on and they hasten obsolescence. Several manufacturers have incorporated them in 1957 designs. One of the first to present them publicly was Frigidaire, which brought its fast-moving stage show to the West last month. Frigidaire calls it the Sheer Look; points out that the new design will give the kitchen a built-in look without remodeling, will blend into new or old homes, will merge with kitchen cabinets and room architecture. Also back is black—or more properly dramatic charcoal grey—which almost stole the show at Frigidaire's Oakland performance. In refrigerators most significant Frigidaire change is in door and cabinet design. The door is inset in the cabinet like a picture in a frame; door seal wires, hinges and latch are no longer visible; door does not extend so far into the room as on previous models. Advantage is that base cabinets can be installed flush with refrigerator sides; refrigerator door can be opened 180° before it touches the cabinet. A lever-operated device that ejects an entire trayful of ice cubes at a time and a door planner are other new features. Some range models incorporate a Cook-Master oven control with two-step directions for automatic cooking on the panel; a heat minding device for surface cooking.

Selling shows

SMUD is presenting two selling demonstration shows. One on automatic laundry equipment took as its theme, "Beats Hanging Up Clothes," was given a boost by early rains in Sacramento. Clothes are modeled, then washed and dried and modeled again. The other show pushes small appliances. Demonstrations are put on by **Maxine Gentis** and **Marietta Taylor.**

New set-up

Salt River Power District has a new division, Residential and Commercial Development, **L. M. Alexander,** assistant general manager in charge of development, sales and customer service, reports. **Franz Lupton,** supervisor of marketing and sales, who has been in charge of industrial development, will add responsibility for residential and commercial activities. **Don Parlett** will be supervisor of the industrial development division, **Glen Baker** of the residential and commercial development division.

Show it to him

Electric dryers were promoted by Southern California Edison in about 200 daily and weekly suburban newspapers on Dec. 1 to introduce a three-month sales campaign. The ads used cartoon-type illustrations; each depicted an unpleasant aspect of wash day without an electric dryer. Full-page full-color ads in Los Angeles magazine sections also featured dryers. Theme of the campaign is "Show This to Your Husband." Point of purchase material is available and Edison will supply for pre-Christmas displays soft sheet and easel back card facsimiles of its dryer billboards. Completely new material will be available for use after Christmas.

Plan early

A comprehensive guide for **National Electrical Week,** Feb. 10-16, has been distributed to the industry by sponsors of the observance.

For your valentine

Valentine's Day is being set up as a day **to promote electrical gift giving.** Official Valentine's Day Council Inc. has been organized, with Edward W. Hodgetts, Cincinnati G&E, and Harry Price Jr., past NARDA president, on the retail advisory board. Council office: 15 E. 40th St., NYC.

LBE conclave for women

Sponsored by the EEI home economics committee, a **Women's Live Better . . . Electrically** conference will be held at the Edgewater Beach Hotel in Chicago, Jan. 10-12. According to **Marguerite Fenner,** PG and E, who is co-chairman of the publicity committee, the program will be brimming with information, inspiration and demonstration know how. Speakers will be experts in their fields. The conference will end with a Merchandise Mart tour.

Also Give Better

Give Better . . . Electrically is a cute twist to the LBE theme for Christmas promotions. You can get LBE Christmas stockings, too, from Fred S. McCarthy & Co., 541 Lexington Ave., New York 22, N. Y. They come in three sizes—5 ft, 3 ft and a small one. Then there is the electric rotating musical Christmas tree stand available from Spincraft Inc., 4122 W. State St., Milwaukee, Wis.

Seeing is believing

Electric cooking is getting a 24-hour-a-day plug as a by-product of the design of Honolulu's new Tops restaurant. Patrons can see food being prepared from both the dining room and the coffee shop, and both are all-electric. The coffee shop has electric char-broilers, fryers, grills, hot plates and roll and food warmers. The kitchen serving the dining room has every electric convenience for receiving, storing and preparing foods—down to the last detail, an electric silver **burnisher.**

Really covered

Saturation coverage was probably achieved with a marathon broadcast from Salt River Power District's Electri-Living home recently. Radio Station KPOK was broadcasting from the home from 10 a.m. to 6 p.m. on the first day of public inspection. Most of the time was spent interviewing visitors.

Hawaii home show

Honolulu Junior Chamber of Commerce and the local OHI committee have announced dates for a 1957 home show. They are Feb. 22-24. To be held at Jaycees' new Honolulu building, the show will have a queen and several special **events.**

New set-up operating

Northern California and Nevada dealers of G-E major appliances and TV receivers are now being served by the newly established General Electric Appliances Co. facility in Burlingame, which has taken over from G-E Supply. The new 130,000-sq-ft building has complete warehousing, shipping and display space; represents **a $1,000,000 expansion. About 150 will be employed at the Burlingame headquarters in addition to employees in Sacramento and Fresno. Harry P. Gough is manager of the new operation. V. L. Hobson** heads dealer sales, **W. E. McConaha,** builder sales. **E. M. Ames** is in charge at Sacramento and **R. P. Swanson** at Fresno.

Another merger

Landers, Frary & Clark has purchased assets of the **Standard Products Corp.** and the **Everett E. Young Co.** Standard makes the Handy-Hannah line of electric housewares distributed through department stores, dealers and wholesalers. The Young Co., an affiliate, handles real estate and production. The Handy-Hannah line will continue to be made in the Whitman, Conn., plant which may be expanded. LF&C has four other subsidiaries.

New quarters

W. A. Ramsay Co. is building a $350,000 retail headquarters at Honolulu. Facilities will include a 75-car parking lot, offices and warehouse in addition to display space. Ramsay company is appliance distributor for American Factors. **George Rinker is manager.**

Builder division

Builders will be wooed by the newly created Builder Sales Division of Borg-Warner Corp. **Joseph P. Halpin** is general manager of the division. Targets will be large builders of residences, hotels, motels, apartments, etc.

Prices up

Price hikes are effective now on a number of Motorola radios. Two transistor models in the portable line are affected and seven home models and 11 clock-radios.

New duties

With separation of Hotpoint Appliance Sales Co. from G-E Supply at San Diego **George Yoshonis** is now responsible for Hotpoint major appliance sales and **Joe Faringer** for TV. **Hollis McClaren** is inside representative. G-E Supply continues to distribute small appliances and radios.

Distributor news

New distributor appointments in the West include: **Davis Distributors,** Honolulu, which has Norge appliances . . . **Scott Brown Construction Specialties,** Phoenix, Republic Steel Kitchens . . . **Columbia Electric & Mfg. Co.,** Spokane, which has Amana products in 32 counties in Washington, Idaho and Montana.

Norge shift

With retirement of Sues, Young and Brown from the white goods field, **Norge distributorship in southern California** probably will be taken over by Graybar's Los Angeles division.

Change at SYB

Charles P. Culbert, vice-president in charge of sales at Sues, Young & Brown for the past seven years, has resigned effective Dec. 31. Fact that SYB has gone out of white goods business is responsible, Culbert said. In his press announcement **M. G. Sues** paid high tribute to Culbert, who during Sues serious illness had assumed full responsibility for advertising, merchandising and sales activity. Now fully recovered Sues will take over sales and merchandising for the company.

Transfers

Tom E. Mumford has been made general manager of the Hoffman Sales Division of San Francisco. His former post as Oregon manager has been taken over by **William J. Merrill,** former southwest district manager. **William J. Cluney** has been transferred from Cincinnati to replace Merrill. Resignation of O'Farrell Welch at San Francisco brought about the changes.

News about people

Ralph J. Phillips, San Diego G&E vice-president in charge of sales, has been elected Chamber of Commerce president . . . **Edgar B. Wilkinson** is now wholesale department manager of Easy Appliance Co. in Honolulu . . . **R. J. Culver** has been made general manager of the RCA Victor Television & Radio Division in Hawaii. **H. E. McLellan,** TV and radio manager of the T. Eaton Co. store at Vancouver, has been transferred to the Chilliwack branch. **A. H. Jukes** comes from Victoria to replace him . . . **William Ross** of Stockton, owner of Ross & Hill, was named Norge Viking dealer of the year . . . **Peter Prussing** is among the new regional sales managers appointed to market RCA-Whirlpool home appliances. He is at Hollywood . . . **Richard Finch,** Home Appliance Co., Medford, Ore., is the West's representative on the NARDA nominating committee . . . **Roger J. Delander,** San Francisco, is now Western sales manager in Sylvania's new fluorescent fixtures sales organization.

Stalls increase

Telechron stalled price increases on four clocks until Jan. 2 to avoid conflict with dealers' promotion pieces already printed for Christmas. The increases amount to $1 each on Snooz-Alarm, Harlequin, Swirl and Designer.

Mix or match

Color styled to mix or match with G-E appliance colors, Textolite surfacing material will come in more than 80 patterns and colors next year. A new file-size brochure, T-CDL-404, is available from General Electric's Laminated Products Department, Coshocton, Ohio.

Cool aqua

"Cool Light" is the name given to Sylvania's new addition to the decorator light bulbs. It is an aqua tinted unit on the cool side of the spectrum.

Combo

Television and phonograph are combined with a high fidelity-audio system in a new unit announced by Admiral Corp. The TV screen is a 21-in. The audio system has three hi-fi speakers.

Accent on freezer

Increasing accent on the "freezer" portion of refrigerator-freezers is noticeable as the 1957 lines are announced. **Quicfrez Inc.** has a combination unit that divides the space 8 cu ft refrigerator and 6 cu ft freezer. **Thermador** has a built-in model that has 10.2 cu ft of refrigeration and a 4-cu-ft freezer. In both units the freezer is at the bottom portion of the appliance and has a separate door. **Gibson's** 20-cu-ft "Market Master" is nearly half-and-half.

Dryer models

Two dryers are offered by Stiglitz Corp. in 1957. A price spread of about $80 gives one model a traffic-building appeal while the top model carries the eye appeal and higher dealer profit features. Made for 115/230-v service.

Portable space heating

At least five manufacturers of electric space heating units have announced the addition of portable models this year. Ceilheat, Everwarm, Berko, Electromode and Emerson are offering the portable feature. Emerson's also has a fan. The Ceilheat and Everwarm units require 240-v outlets; Berko and Emerson require 120-v outlets. Electromode is not specified.

Pocket size

Pocket-size all-transistor radios are now offered by Admiral Corp. and Westinghouse. The Westinghouse model contains five transistors and a diode crystal and the Admiral units come with either seven or four transistors. Westinghouse announced a seven-transistor model earlier. All sets have jacks for plugging in hearing aid type earphones.

70% STRONGER IN COMPRESSION
1000% MORE RESILIENT
30% LIGHTER

New Westinghouse reactor rated a hands-down winner

Remarkable Westinghouse polyester-glass is stronger, more resilient, more versatile by far than any material ever before used in reactor cleat construction. Stronger, less bulky, and with greater dielectric strength, for instance, than conventional concrete. Cleats are bonded into solid vertical columns by high-strength resin tie rods, another Westinghouse innovation. Equally serviceable indoors or out, polyester-glass is impervious to moisture or any other atmosphere condition. In short . . . damage, aging and therefore maintenance are all but eliminated.

All facts. Tough facts, too, but look what current-limiting reactors have to put up with. Forces generated by short circuits and by expansion and contraction of conductors under heavy overloads subject equipment to terrific thermal and mechanical shock.

In the battle of the short circuits the new Westinghouse dry-type reactor is a hands-down winner. For more facts, get in touch with your Westinghouse sales engineer, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-70774-X

The six columns of a typical Westinghouse reactor have the compressive strength to support the weight of the largest power transformer ever built . . . 365,000 lbs.

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING FOR **YOU!***

PRODUCT NEWS

New Designs and Applications

Digital Demand Recorder

(1) Fischer & Porter Co., 848 Jacksonville Road, Hatboro, Pa.

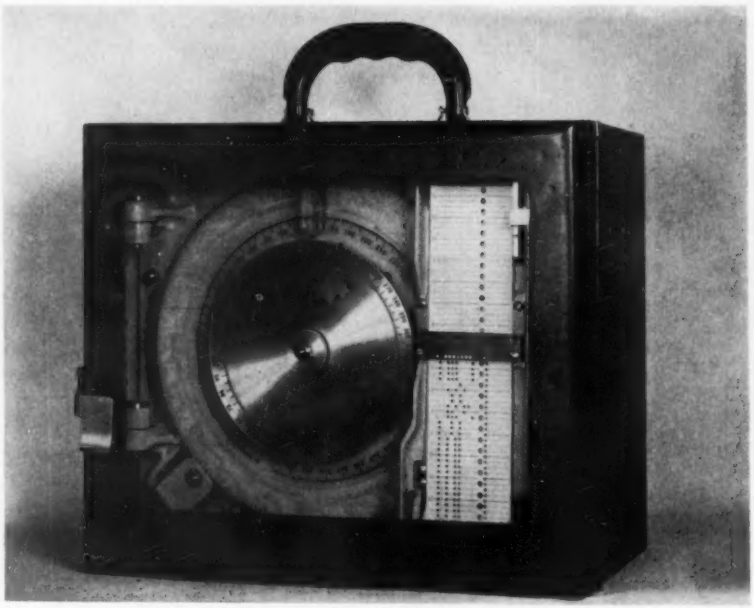
This company has developed a digital demand recorder that automatically produces a punched tape record of watt-hour demands. The punched tape can be read visually with ease or processed quickly by an automatic tape translator operating a card punch.

Completely automatic procedures in customer demand billing are possible with the unit, besides its use to provide load research information showing system load characteristics.

The unit operates from the standard contact making mechanism on the watt-hour meter. It is a completely electromechanical device with few close tolerances, making it reliable and long lived. It is said to be accurate to plus or minus one count in 400.

Three basic mechanisms make up the recorder; a pulse counting mechanism, a paper punching and transport mechanism and an interval timer. Contact closures from the contact mechanism in the watt-hour meter are added up in the pulse center. At the end of the demand interval the punching mechanism is actuated and the watt-hour demand punched on paper tape.

Catalog 58-40 carries full details.



Splicing Tool

(2) Aluminum Co. of America, 1501 Alcoa Bldg., Pittsburgh 19, Pa.

Simplified splicing of smaller sizes of ACSR results from development of this new tool and joining technique. Hooks are formed from the steel core by the tool, and then joined and clinched. No steel sleeve is necessary. An aluminum sleeve is then centered over the joint and compressed. Connection is said to have a minimum strength of 95% of conductor strength. Hook joints can be made in ACSR sizes No. 6 to 2/0, inclusive, and in other conductors with similar core sizes. One tool serves for all sizes.

Compound Applicator

(3) Burndy Engineering Co. Inc., Norwalk, Conn.

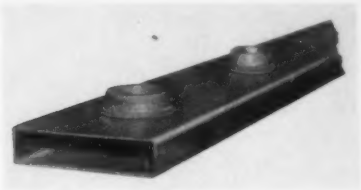
Penetrox joint compound for aluminum or ACSR connections now comes in plastic squeeze bottles for easier application by linemen. It is still available in collapsible tubes and pint, quart and gallon cans.

This Lorain Moto-Crane was used by Contractor Winton Jones, Concord, Calif., to construct 12 transmission towers for Pacific Gas and Electric Co. at Brewers Island, San Mateo. Pictured is a 25-ton model used to drive 75-ft piles for the foundation footings

Hole Saw Kit

(4) Henry G. Thompson & Son Co., Chapel & Mill Sts., New Haven 5, Conn.

Designed for electricians, this new kit consists of six Milford high-speed hole saws from 7/8 to 2½ in. in diameter, three arbors and a 12-in. extension. One arbor is a follow-through type. The kit is in a metal box, with space provided for extra hole saws.



Underfloor Duct

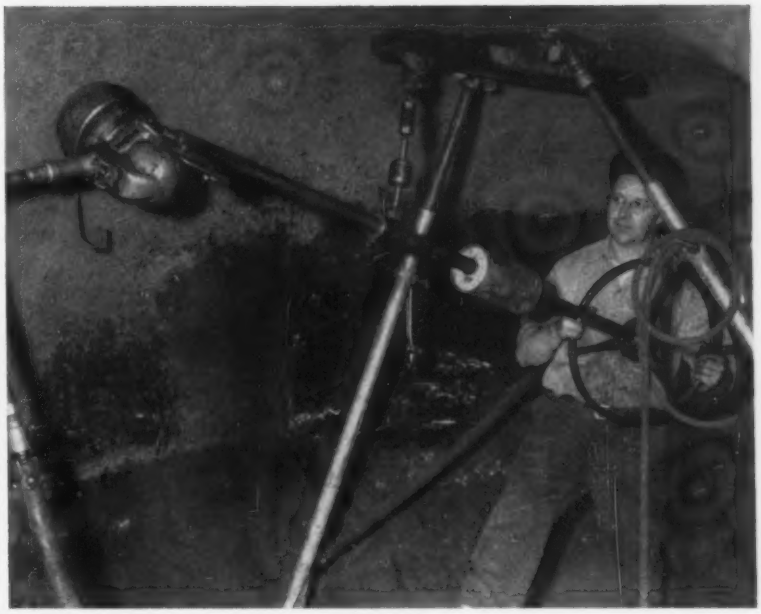
(5) Walker of Conshohocken, Conshohocken, Pa.

This new, large duct is now available for use in Walkerduct underfloor systems, either by itself or in combination with No. 2 duct, which is 1¼x3⅛ in. The new No. 4 duct is 1½ in. high by 6½ in. wide, and is designed with capacity for future electrical expansion. Furnished in 10-ft lengths with five factory preset inserts on 24-in. centers.

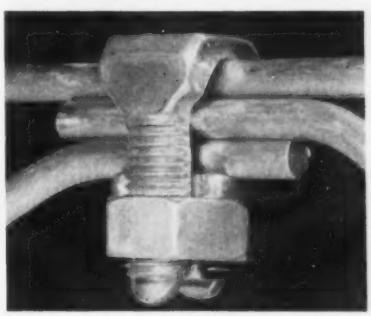
Stud Driver

(6) Fastening Devices Inc., 369 50th St., Brooklyn 20, N. Y.

Fastenings are driven into concrete, brick or steel without drilling holes by use of this hand tool. Sets a wide variety of fasteners with use of the stud driver and a hammer.



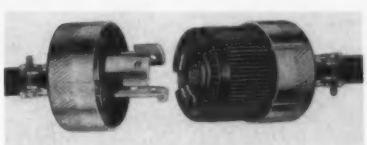
Grinding of the old unit turbines at the Gorge power house of Seattle City Light has been made easier by this jig. Bud Tonkyn, the operator, designed the jig to relieve the operator of the old chore of holding the grinder while working on overhead areas. The jig is easily reset in a new position. Tonkyn is station machinist at Gorge plant



Three-Wire Connectors

(7) Burndy Engineering Co., Norwalk, Conn.

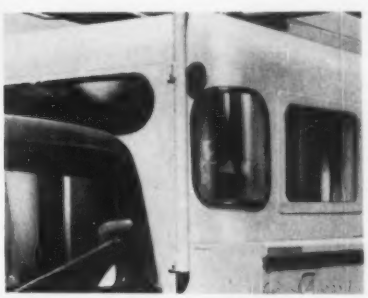
This company has added a line of three-wire, split-bolt connectors to its Servit line. The line will accommodate conductors through No. 2 solid.



Lock-Type Connector

(8) Harvey Hubbell Inc., State Street, Bridgeport, Conn.

Screwless pressure grip terminals are incorporated in the design of this new twist lock connector, eliminating conventional binding posts and reducing wiring time as much as one-third, according to the manufacturer. Available in two-, three- and four-wire units with various amperage and voltage ratings.



Compartment Windows

(9) J. H. Holan Corp., 4100 W. 150th St., Cleveland, Ohio

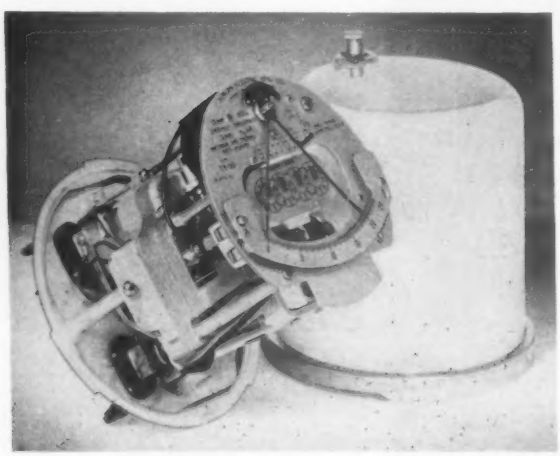
A curved corner window and another front window are now available as optional features of this company's line crew truck compartments. The corner window is of plexiglass, the front of safety glass. Both are stationary.

Fill in Coupon on Page 68

Distribution Transformer

(10) Gardner Transformer Division, Federal Pacific Electric Co., 4227 Hollis St., Emeryville, Calif.

Weight reduction of 55 lb, a core efficiency increase of 57 w and a height reduction of 4 in. have resulted from redesigning of this company's 25-kva distribution transformer. The new transformer (shown at right) has eight radiator tubes on the outside of the tank. The model it replaces is shown for size and design comparison.



Thermal Demand Meter

(11) Duncan Electric Mfg. Co., Lafayette, Ind.

The manufacturer reports that this new single-phase thermal demand meter is actually two meters in one. It has a scale capacity of either 12 or 24 kw, with change-over from one to the other accomplished by a range switch and turning over the scale plate. The meter is for loads up to 100 amp. The dual-range feature is said to provide savings in metering equipment investment and simplifies stocking.

Pole Sounder

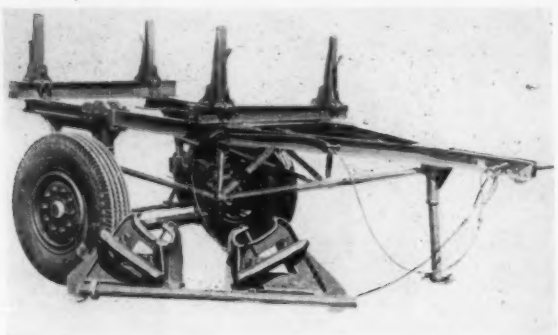
(12) Engineers Tool Co., 116-118 W. Main St., Lake City, Iowa.

This company offers a 58-in. probe with an impaction handle for testing the condition of poles without digging. The tool penetrates the pole six inches below the ground and vibration in the handle tells operator the degree of decay. Weighs 7½ lb.

Cold Cathode Lighting

(13) Celine Inc., Batavia, Ill.

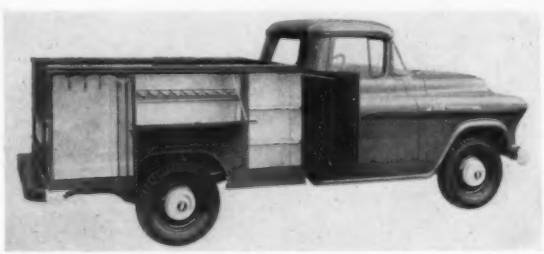
Cold cathode lighting fixtures for installation in schools have been designed by this manufacturer. The new line consists of three basic fixtures, five additional lamp combinations, and is said to provide "line lighting with spot hanging." The fixtures are said to give 30 f-c at desks and about 75% of that at chalk boards.



Reel and Pole Trailer

(14) Adams Engineering Co., Solon Rd., Solon, Ohio.

A combination cable reel and pole trailer has been added to this manufacturer's line of utility equipment. With standard reel saddles and guides, the trailer is used for reel transport; with interchangeable bolsters, it serves for carrying poles. Conversion is made with standard hand tools. It is equipped with necessary reel accessories.



Service Truck Body

(15) Utility Body Co., 1530 Wood St., Oakland, Calif.

A die formed, antibuckling, heavy-duty plate floor is an outstanding feature of this new utility body. It has 15-in. compartments with shelves and trays and double panel doors with slam-action catches. Rolled edges on all parts is a safety feature. At buyer's option, service body will be painted and installed or prime coated for shipment.

US RUBBER STREET LIGHTING CABLE

Tappan Zee Bridge* lighted by 40 miles of "U.S." ozone-resistant cable

A total of 258 luminaires is used for lighting this bridge spanning the Hudson River, making it probably the best-lighted bridge in the world. To minimize distribution costs, constant current series circuits are used.

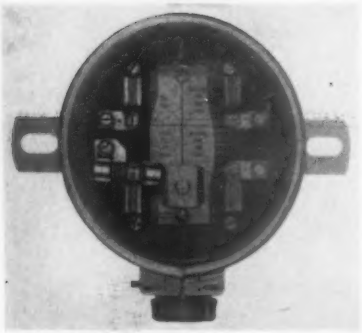
The 40 miles of cable used on this lighting system is *ozone-resistant* "U. S." Series Street Lighting Cable, Uskorona – 2, butyl insulation, 7,500-volt shielded, U. S. Spec. #831. The neoprene jacket provides the greatest protection against weather, acids, oils and all-around abuse. Yet the cable is light in weight and easy to handle.

For electrical wires and cables to fill any requirement, to handle any wiring need, write Electrical Wire & Cable Department, United States Rubber Company, Rockefeller Center, New York 20, N. Y.

**Part of New York State Thruway system*

US RUBBER Electrical Wire & Cable Department

United States Rubber



Load Fuse Assembly

(16) Fisher-Pierce Co., 74 Pearl St., S. Braintree, Boston 85, Mass.

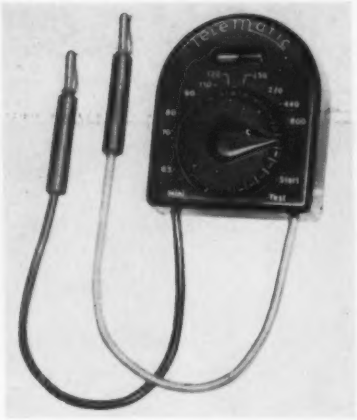
A new load fuse assembly is now available for convenient mounting inside the sockets of photoelectric lighting controls. It provides a method of fusing the load side of photoelectric controls mounted on standard watt-hour meter sockets. Installation requires only the replacing of one meter socket terminal block with a new one. Available as separate component or factory-installed accessory on the manufacturer's controls.

Grease Cartridge

(17) Standard Oil Co. of California, 225 Bush St., San Francisco 20, Calif.

A packaging system used widely by the food industry has been adapted for the petroleum industry. Multipurpose grease for automotive equipment lubrication is placed in a Saran cartridge for convenient, dirt-free handling. Grease can be stripped into gun, or the top can be cut away and the entire cartridge can be placed in the gun.

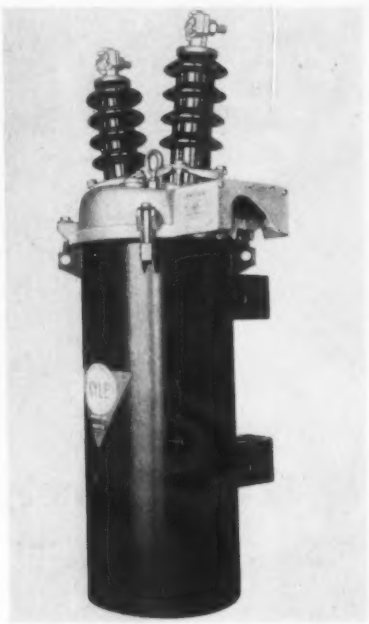
To Secure Bulletins Fill in Coupon on Page 68



Voltage Tester

(18) Omega Products, 4700 W. Washington Blvd., Chicago 44, Ill.

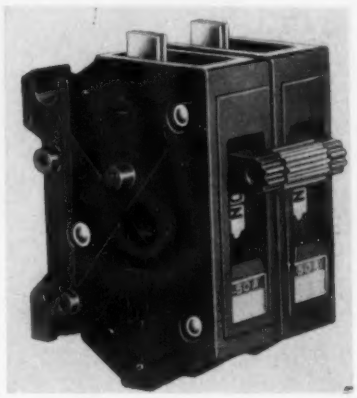
Mini-Test is the name of this new pocket-size voltage tester. It will test from 65 to 80 v a-c and d-c. Voltages are read directly from dial.



Circuit Recloser

(19) Line Material Co., 700 W. Michigan St., Milwaukee 1, Wis.

This new intermediate duty oil circuit recloser is the single-phase counterpart of the type 6H three-phase recloser. It is rated 214 to 14.4 kv. The new type 4H is a power class recloser that will supplement the distribution class type H recloser on systems requiring greater load and interrupting capacities, according to the manufacturer. Adaptable for pole or substation installation. The recloser is available with load current ratings of 5, 10, 15, 25, 35, 50, 70 and 100 amp. It provides a maximum interrupting capability of 3,000 symmetric amp or 4,200 asymmetric amp at 4.8 kv.



Circuit Breakers

(20) Wadsworth Electric Mfg. Co. Inc., Covington, Ky.

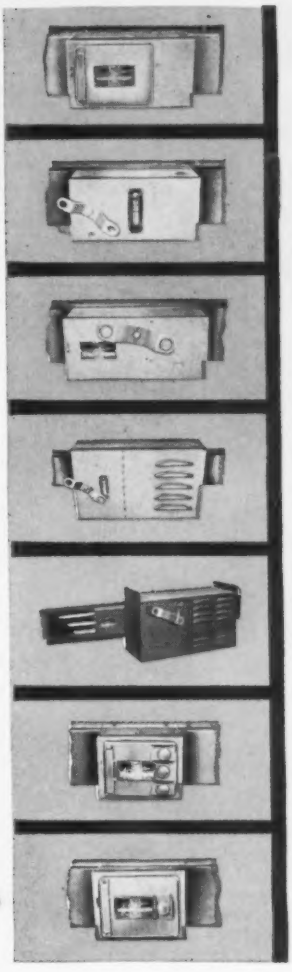
This new two-pole circuit breaker is a thermal-magnetic, quick make and break unit for 120-240 v a-c in 30, 40 and 50 amp. Time delay is built into the breaker to avoid nuisance tripping. Poles trip separately.

Potheads

(21) G&W Electric Specialty Co., 7780 Dante Ave., Chicago 19, Ill.

This company's type ATA potheads for 200-lb-psi oil- or gas-filled pipe-type cables are now made in a three-conductor style for generator cable terminals. The spreader head body is welded nonmagnetic stainless steel. No castings are used in contact with the high-pressure oil or gas.

Fill in the Coupon on Page 68



7 ways to safer Plug-in Power / ...yours with BullDog Bus Plugs!

BullDog Bus Plugs for Plug-In Duct meet a full range of applications, perform with top efficiency and safety. Seven plugs are available—from types which tap power instantly from the duct to types which provide constant safety checks on its operation.

The seven BullDog Plugs—BP, Vacu-Break®, Circuit-Breaker, Capacitor, Transformer, Ground Detector, and Temperature Indicating—are all safety engineered.

Plugs mount on either side of the duct with ease, speed, and safety—and their compact design insures maximum use of all plug-in openings. In combination with Plug-In Duct, Bus Plugs provide a branch circuit distribution system of the greatest flexibility, convenience, and safety. It's a system which features *plug-in power*, to serve both immediate and future needs.

See how BullDog Plug-In Duct and Bus Plugs can serve you. See your qualified electrical contractor, distributor or BullDog field engineer—or write BullDog Electric Products Company, Detroit 32, Michigan. ©BEPCO

IF IT'S NEW...IF IT'S DIFFERENT...IF IT'S BETTER...IT'S **BULLDOG**

ELECTRIC PRODUCTS COMPANY

A Division of I-T-E Circuit Breaker Company

Export Division: 13 East 40th Street, New York 16, N. Y. • *In Canada:* BullDog Electric Products Co. (Canada) Ltd., 80 Clayson Road, Toronto 15, Ont.

CONSULT THE FOLLOWING PACIFIC COAST REPRESENTATIVES:

COAST ELECTRIC & MANUFACTURING CO.
1733 N.E. Seventh Avenue, P.O. Box 7712
Portland 12, Oregon

YOUNG ELECTRIC & MFG. CO.
2134 Curtis St.
Denver 2, Colorado

SAFETY SWITCHBOARD COMPANY
910—89th Avenue
Oakland 21, California

BULLDOG ELEC. PROD. CO. OF LOS ANGELES
2885 E. Washington Blvd.
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CHANGE ELEVATION WITH MAN ON PLATFORM

New Holan Series 2500 Ladder gives you some of the benefits of a fully-hydraulic ladder at a price close to that of a mechanical ladder. Angle of elevation can be changed with a man on the platform.

For your copy of the 2500 catalog, use the coupon below.

J. H. HOLAN CORPORATION
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To: J. H. Holan Corporation
4100 West 150th Street
Cleveland 11, Ohio

Please send me the catalog that tells all about Holan's Series 2500 Ladder.

Name_____ Title_____
Address_____
City_____ Zone_____ State_____

BULLETINS ETC.

(22) SERVICE STATION LIGHTING—Steber Mfg. Co., Broadview, Ill., has published Form 1082 to illustrate and describe its complete line of modern service station lighting equipment.

(23) CIRCUIT BREAKERS—A new bulletin with details on principle, design, operation and application of hydraulic-magnetic general purpose circuit breakers is available from Heinemann Electric Co., 434 Plum St., Trenton 2, N. J. Fully illustrated with diagrams and tables.

(24) RESEARCH—Allis-Chalmers has released a picture story on its Central Research Laboratories in booklet form. It shows the facilities used by the company's product and design engineers to aid with development of new products. Ask for bulletin 4888448. Address is Allis-Chalmers Mfg. Co., 939 S. 70th St., Milwaukee 1, Wis.

(25) CATALOG ADDITIONS—Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y., has issued a set of page additions and replacements for the Anaconda General Catalog. This new group should not be confused with another recently made available. It is the latest release.

(26) WIRING DEVICES—Arrow-Hart & Hegeman Electric Co., 103 Hawthorn St., Hartford 6, Conn., has issued Wiring Device Catalog No. 29 listing the company's line of wiring devices and enclosed switches.

(27) INSULATORS—General engineering data and latest EEI and NEMA standards on porcelain insulators are carried in a new catalog published by Victor Insulator Division of I-T-E Circuit Breaker Co., Victor, N. Y. Catalog No. 56 is tab-indexed and bound in loose-leaf form.

(28) PARTNERS IN PROGRESS—General Electric Co. has prepared a booklet that tells the history of the company's long-time partnership with the West. It describes some 65 years of expansion, starting with a modest, two-man office and continuing to the widespread activities of the company in the West today. It is available free by writing to Public Relations, General Electric Co., 235 Montgomery St., San Francisco.

(29) TRANSFORMER PRODUCTION—Production facilities of Hill Transformer Co. Inc., 1030 Washington St., San Carlos, Calif., are given photographic emphasis in a general descriptive brochure recently published. The company makes oil-filled, askarel-filled and dry-type power and distribution transformers.

(30) POLE LINE HARDWARE—The Pole Hardware Division of Malleable Iron Fittings Co., Branford, Conn., has issued a 24-page illustrated price list on its line of pole line hardware. It is supplementary to the general catalog.

(31) AIR INTERRUPTER SWITCH—The Continental Electric Equipment Co., 205 W. Fourth St., Cincinnati 2, Ohio, has published a fully illustrated catalog to give full details on its new high-voltage air interrupted switch. Ask for bulletin 100.

(32) CIRCUIT BREAKERS—Descriptive and application information on the complete line of Cordon current limiting circuit breakers made by the Small Air Circuit Breaker Division of I-T-E Circuit Breaker Co. is carried in a new bulletin. Write to the company, Dept. 18, 19th & Hamilton Sts., Philadelphia 30, Pa. Ask for bulletin 5042.

KILL TWO BIRDS WITH ONE STONE—Fill out this coupon and get back valuable information from as many sources as you indicate.

ELECTRICAL WEST ***Not good after February 1***
68 Post St., San Francisco 4, Calif.

Please send me, without obligation, the new product information or catalogs:

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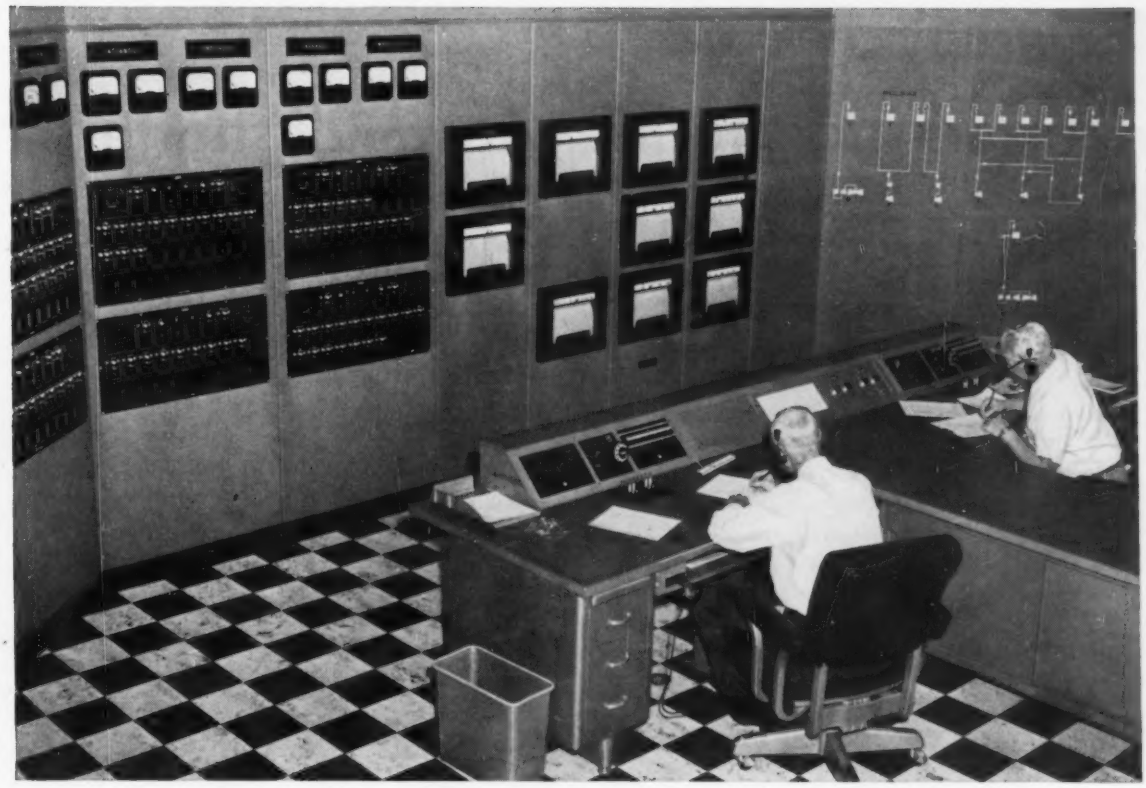
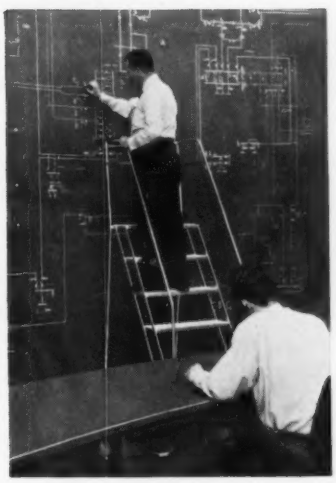
*Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.



This new Systems Operations Center of the Jersey Central Power & Light Company keeps in touch with remote stations through Bell System channels for telemetering and remote control.

Bell System communications help Jersey Central regulate power transmission



Colored pegs in wall diagram indicate segments of line to be isolated for maintenance work.

Channels for telemetering and remote control enable the Jersey Central Power & Light Company to regulate power transmission every step of the way from generator to home, store and factory.

An engineer glances at the dials, which give him a running picture of the system and the changing demands he has to meet—information which has been brought to him by Bell System telemetering channels.

From his position, he switches loads, starts and stops generators and localizes failures—even at distant points—over a network of remote control channels provided and maintained by the Bell System.

If you would like to know more about how Bell System communications can help you, an engineer will be glad to survey your company's needs. There's no obligation. Why not call your Bell Telephone representative today?

BELL TELEPHONE SYSTEM

Private Line Telephone, Private Line Teletypewriter
Channels for: Data Transmission, Telemetering, Remote Control, Telephotograph, Closed Circuit TV

New space-miser network transformer now 12″ shorter, 20% lighter, occupies 15% less space

Slashing maintenance a dozen ways is the story of the new Westinghouse 500-kva subway transformer. Easier servicing and even better electrical performance place this product in a class by itself.

1. Protection against partial vault flooding—with a 12″ reduction in height, transformers can now be off the floor, set on I beams.

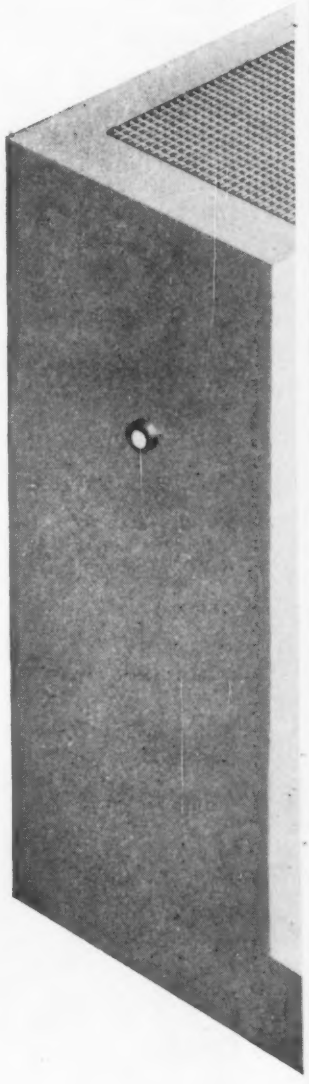
2. Installation easier, handling safer—new transformer is 20% lighter.

3. Contoured . . . round corners replace sharp edges on new diving bell tank.

4. Easier to wash down and paint, virtually self-cleaning—new contour design of Yukon Coolers eliminates 68 former sources of corrosion.

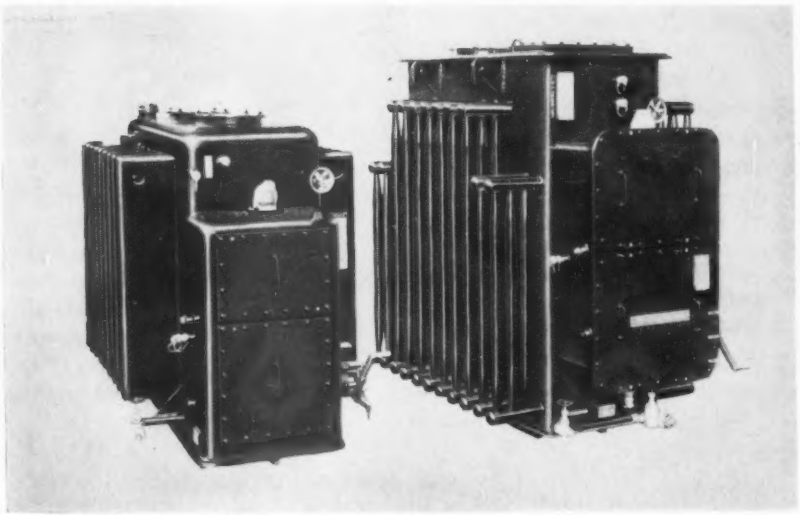
5. More accessible high-voltage terminal chamber—exclusive integral tank design lowers switch compartment; switch and core-coil assembly now housed in one smooth, unwelded exterior on a common base plate.

For network transformers that set the standard, talk to your Westinghouse sales engineer, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-70781

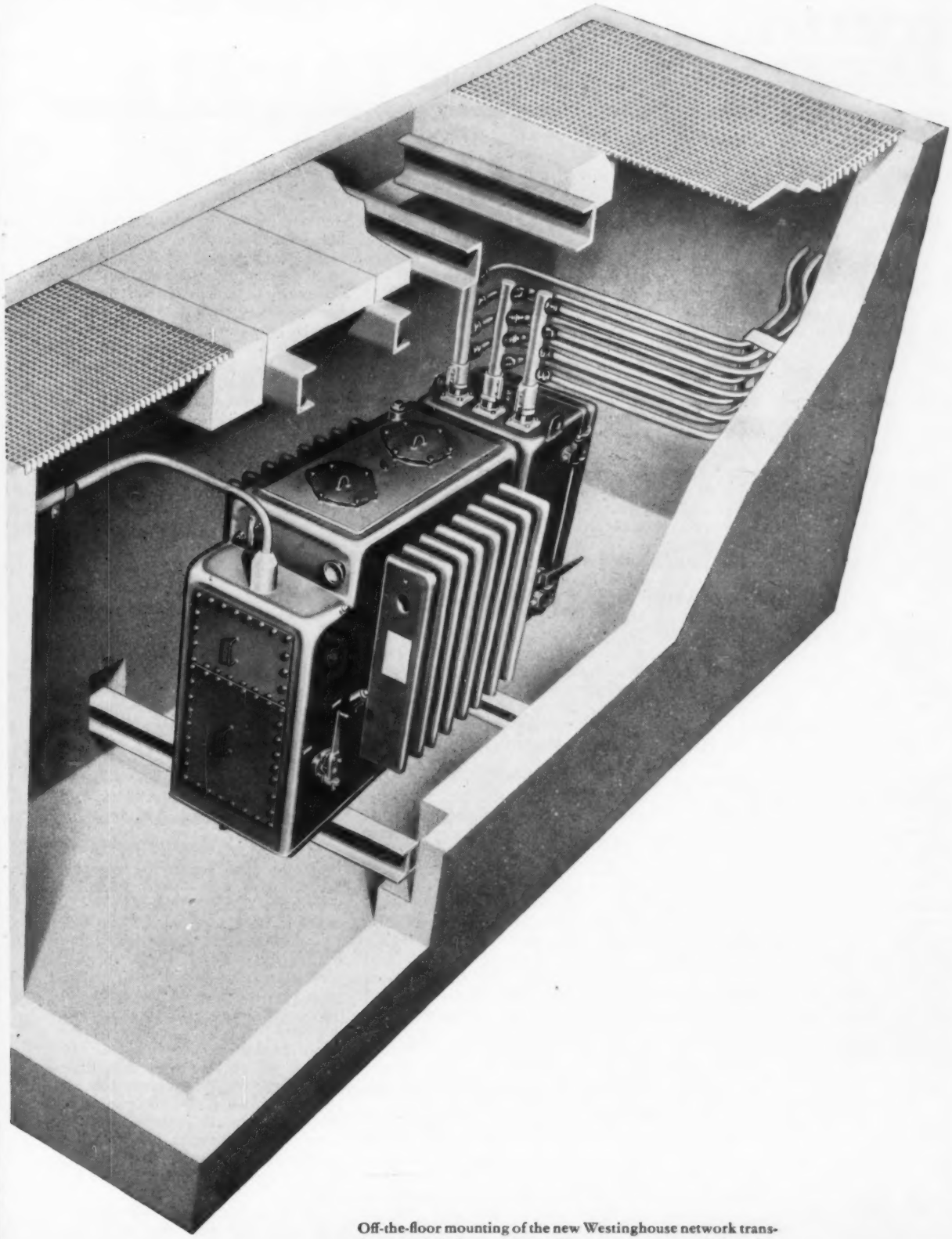


WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING FOR **YOU!***



(*Right*) Previous 500-kva network subway transformer. (*Left*) New Westinghouse design features exclusive Yukon Coolers, greater spacing, more clearance to floor—refinishing is no problem.



Off-the-floor mounting of the new Westinghouse network transformer minimizes contact with corrosive matter; inspection and maintainance are quicker, easier.

ELECTRA'S HUSBAND

"Who Really Won?"

"WHAT happens now?" asked Electra as she switched off the final election returns. Three couples of us had been watching the "pile-up" of electoral votes. One of the men was a business associate and the other a well-known professor of political science. He picked up the conversational ball with the observation:

"The way the vote has been running is cause for considerable speculation. It has been a demonstration of the vitality of the two-party system and a rather remarkable display of voter independence. I, of course, am referring to the extremely large numbers of split ballots that were cast. If my memory serves me right it's been over a hundred years since an incoming presidential candidate did not capture at least one of the houses of Congress."

"Why do you suppose so many people did that?" asked one of the ladies.

"I think I have an angle on that one," replied Electra quickly. "People just have more confidence in a square deal from Ike than they have from the GOP at large. They like Ike personally, they respect and admire his leadership, and they trust him apparently a great deal more than they do the Republican Party as a whole."

"The people picked a leader that they like, all right," said the professor. "But they kept a tight rein on his party by giving legislative control to the opposition—a pretty good example of the checks and balances of our democratic system."

My business friend who is a dyed-in-the-wool conservative could contain himself no longer. "Don't you think it's just a little preposterous that the people should be afraid of Republicanism after what has happened in the past four years? After all, it's probably been the most prosperous era in our history. Everybody who wanted one had a job at the highest wages ever, the production of goods and services for the people to enjoy were at the highest rate ever, buying power has been stable and the whole country is more prosperous than ever before by almost any measure. It seems to me that everybody should want more of that kind of government."

"There's no question about that," I said. "I think the big problem that the people are trying to decide is how to keep it and which party will protect the gains that have already been made economically by the low and middle income groups.

"To me, the way people voted seems to be tangible evidence that the country may be going through some sort of a political transition. The balloting certainly appears to represent a return to individualism for there was little indication that the union, religious or racial blocs were very potent."

At this point the professor's wife spoke up: "Along that line, I liked Ike's speech in Los Angeles when he said that there were no little men in this country best of all. The idea of protecting the little man may be good political oratory but it seems to me that economics, not laws, should be the place where everybody puts their faith."

"That's a very astute statement, dear," complimented the professor, "but I should like to point out that wise legislation is necessary to have good economics. And, in this election, it seems to me that there may be a growing awareness on the part of the general public that a good business climate is the best form of personal insurance there is.

"I, too, think that the voters showed a cautious conservatism that indicated that they were not falling for any of the 'pie-in-the-sky' promises. You businessmen may not be completely happy over the results but, in them, I see a real opportunity for business and industry to swing popular opinion over to the concept that the objectives of business organizations and individuals are identical. Both are seeking opportunities, earnings, reasonable freedom of action. Neither can have these things without the other enjoying them, too. But just how you sell the idea to the public is a problem business will have to face up to squarely in the next four years."

"I'll go along with that," said my business friend. "In fact, just the other day I heard one of the country's leading manufacturing executives state that the country's biggest trouble was 'economic illiteracy.' He even went so far as to say that it takes almost a special language to really understand the intricacies of our present society. Of course, he was referring to tax jargon, the language of mortgage agreements, and the phrases used in life insurance policies and social security regulations which all have become an intimate part of the life of every American regardless of his station in life. I'll admit there is a big job to do because the half truths and popular misconceptions about economics are harder to deal with than sheer ignorance."

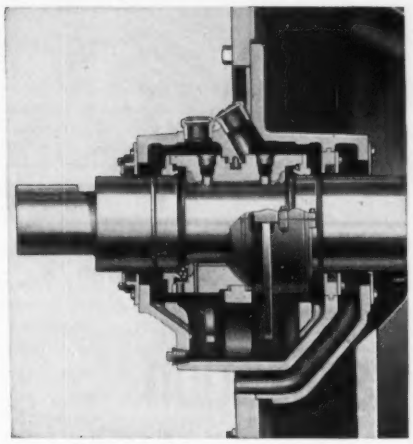
"The old adage live and learn is not so far wrong after all," piped in Electra. "It seems to me the country has come a long way in 20 years. If I remember correctly the campaign slogan then was 'You don't shoot Santa Claus.' And Santa Claus in that case was a federal government spending on a lavish scale. Today there's a bigger and better Santa Claus in the form of a hard-working, nicely balanced economic system. People aren't going to shoot that Santa Claus either if they really believe in him. And don't believe they are."

"That's right, Electra," replied the professor, "but you're not going to make true believers out of those that are doubtful or half convinced by merely doing a good job. If that were true these election results might have been quite different. Certainly good performance is essential, but I'm convinced you still have to tell people not only about the good job you are doing but why it has been possible for the job to be done as well as it has. The election clearly indicates that these last two steps may need some more attention. Anyway," the professor concluded with a smile, "you businessmen have four more years under Ike to consolidate your gains and practice on winning friends and influencing people."

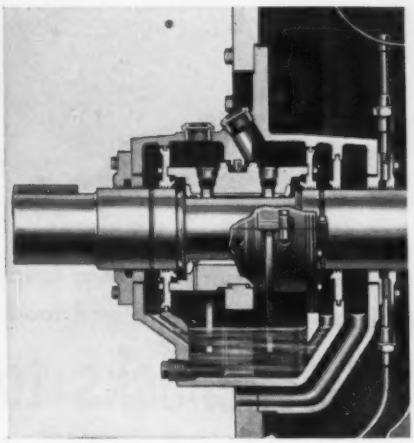
"Well I'm glad that Ike got elected," said Electra. "Even if, from what you say, it may take until 1960 to figure out who really won tonight."

NEW Bearing Design Means Better Motor Performance

Allis-Chalmers capsule-type sleeve bearings now perfected for complete motor line



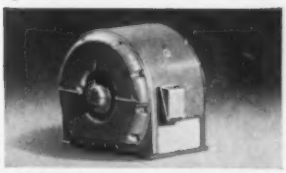
Standard capsule-type sleeve bearing



High speed capsule-type sleeve bearing

A new feature—an improved capsule-type bearing design—has been added to the Allis-Chalmers complete line of large end-shield bearing motors. This new bearing will give you better motor service, simplified maintenance and longer motor life through features like:

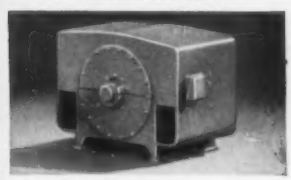
- Dust-tight, leakproof enclosure protects bearing from dirt, dust or abrasive materials.
- Venting system prevents oil leakage — keeps oil and vapor from getting into motor enclosure.
- Dual oil-rings insure bearing surface lubrication — either ring can adequately lubricate bearing.
- Split end-shield gives easy accessibility to winding and air gap — without disturbing capsule or bearing alignment.



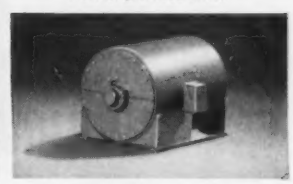
Drip-proof or splash-proof cage motor

Synchronous or wound-rotor motor

High speed cage motor



Weather-protected motor



Totally-enclosed fan-cooled motor

Totally-enclosed forced-ventilated motor

Water-cooled or inert-gas-filled motor

Capsule-type bearings are standard on these Allis-Chalmers motors.

You get MORE from Allis-Chalmers motors

More design and construction features — more application help. For complete information, contact your nearby A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

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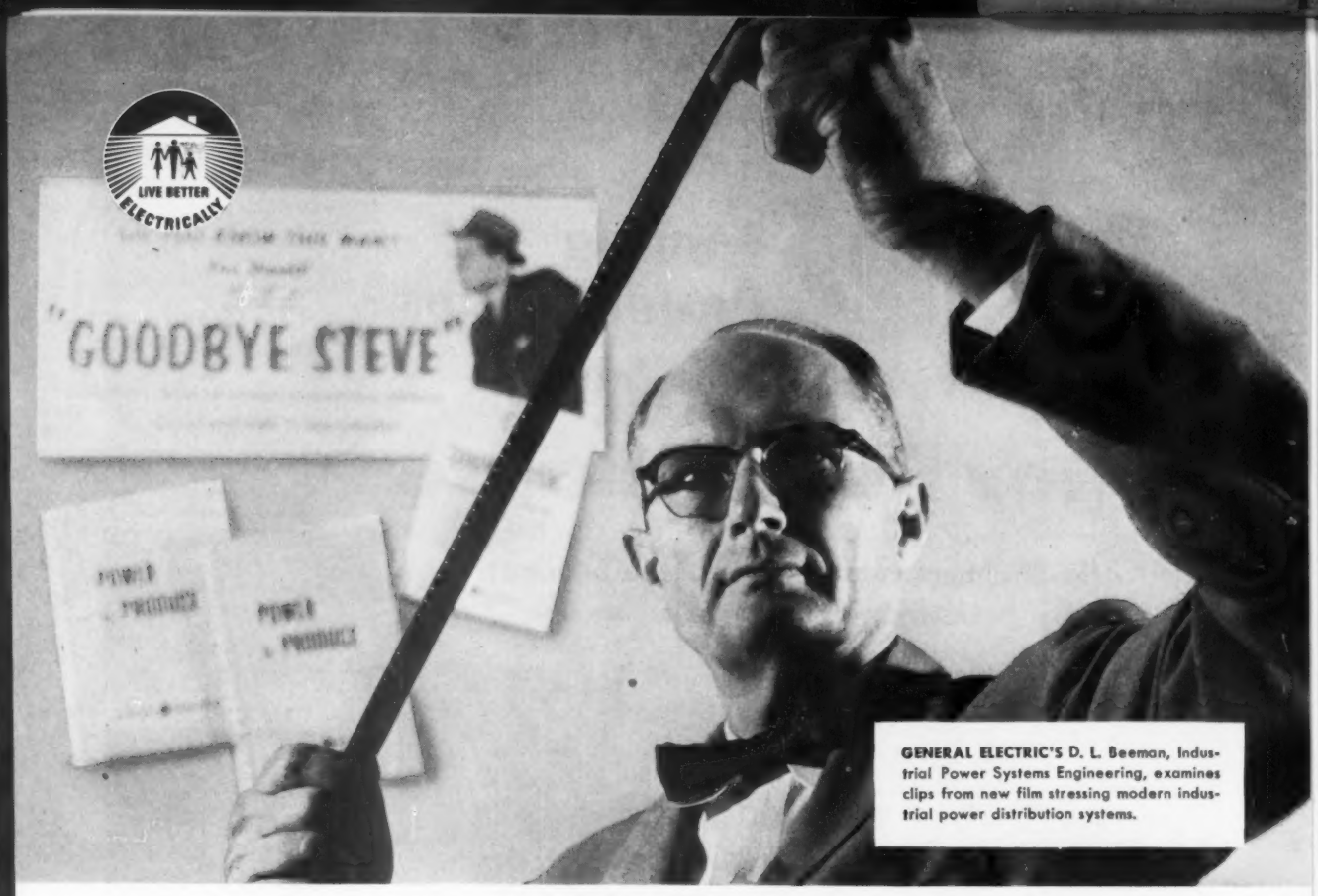
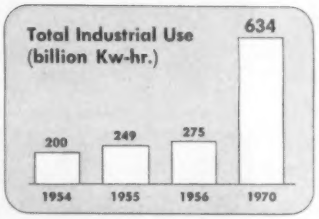
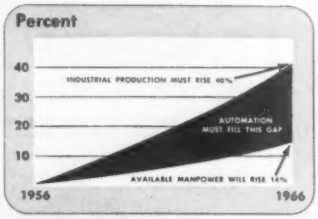


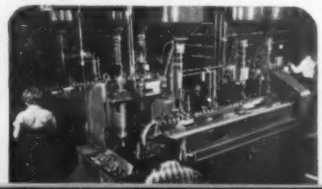
GENERAL ELECTRIC'S D. L. Beeman, Industrial Power Systems Engineering, examines clips from new film stressing modern industrial power distribution systems.

New Industrial Power Distribution Program helps pave way for automation by spurring plant expansion and modernization to . . .

Remove bottlenecks to realization of industrial load growth forecasts







FORECASTS SHOW industry's use of power climbing to 634 billion kw-hr by 1970*. Automation will eventually fill the void left by an insufficient labor force. Automated processes (bottom) like this, used for condenser parts assembly, typify future production lines. *Source: McGraw-Hill Publishing Co.

General Electric's Industrial Power Distribution Program is designed to focus attention on industrial plant power distribution systems, too often neglected by industry. By so doing, it will help pave the way towards meeting load growth forecasts, and will accelerate the trend to automation.

Economists predict that by 1966, the demand for goods and service will increase over 40%, while the available work force will increase only 14%. Obviously the gap will have to be filled by automated processes.

In order to make automation workable, the user must prepare for greater load and closer regulation through a more efficient power distribution system. To help effect this, General Electric has recently launched a comprehensive "More Power to America" program stressing reliability, economy, safety, flexibility and expandability in the plant's distribution system.

A color motion picture, "Goodbye Steve," the manual "Power to Produce," advertisements, Productivity Forums and a host of other aids will explain to industry the need for streamlining its power distribution systems. Motion pictures and manuals to help pave the way to automation for your industrial customers may be obtained through your General Electric Apparatus Sales Office. General Electric Company, Schenectady 5, N. Y. 301-322

MORE POWER TO AMERICA

GENERAL ELECTRIC

ELECTRICAL WEST SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S. VOL. 117 NO. 6 DECEMBER 1956

A top utility executive speaks out forthrightly about the problem of federal power encroachment which, in reality, is a . . .

Takeaway—Not Giveaway

J. E. Corette*

President, Montana Power Co., Butte, Mont.

Most of us in the electric utility industry look at our jobs with a sort of three-dimensional view. First, we are concerned with providing the finest possible service to our customers at reasonable rates. Second, we are concerned with operating our businesses so that the people who have invested their money in us will receive a fair return on their investment. And, third, we want to render real service to our nation and its citizens.

The first two concerns are so basic and so well understood by everyone in business that they need not be amplified. The third function of business merits serious discussion.

I feel very strongly that our industry's obligation to the present and future people of this great nation is to do our jobs in such a way that private ownership, rewards for honest, intelligent enterprise, and personal rights and liberties will be preserved. We have in America greater opportunity, more freedom and finer incentives than any people on earth. Certainly, business and industry, which have exerted so much leadership in making this nation strong, have a solemn obligation to lead the fight for the advantages our way of life has produced.

Socialism or any form of dictatorship destroys all of the opportunities and freedoms which we now possess. Our industry is the first target of socialism, and so the future prosperity and happiness of the American people depend upon us.

There, of course, are many ways in which we can discharge our responsibility in preserving our American system of free enterprise. However, I would like to discuss just two aspects of the problem.

First—Preventing the socialization of American life and industry, and

Second—Maintaining tax equality for all of our citizens so that the people of this nation are not overburdened by taxes and so that they are not deprived of the things they could obtain with the money that otherwise would be paid in taxes.

Fallacy of "Giveaway"

As everyone is well aware, the magic catchword of certain politicians of 1956 is the phrase, "giveaway." It is a trick phrase that was hammered home to the American public from the television screen, the radio microphone and the newspaper columns by politicians and government-power advocates who see in it a key to continued success in their efforts to create a federal power monopoly in the United States. The charge is false.

There *is* a "giveaway" in America today, but it is not the giveaway that these politicians refer to when they attack the efforts of investor-owned utilities to build projects in carrying out their responsibility to the people they serve. It is not the giveaway they refer to when they mislead the public on the true facts of President Eisenhower's partnership policy, which is designed to provide more power faster for the American people, and at less cost to the taxpayers.

The "giveaway" in America today might better be called a "takeaway" because, through promotion of tax-exempt federal power projects and constant opposition to every local program of construction and service, these government-power advocates are blazing a trail designed to:

1. Take away from American citizens the right they have always had to pay for and own property;

2. Take away from the great majority of electric users their freedom of choice in the matter of service; and

3. Take away the opportunity for greater security and prosperity by inflicting a constantly increasing burden of taxation.

The "giveaway" cry of the government-power advocates reaches its highest pitch whenever private enterprise seeks to develop hydroelectric power projects in the normal course of meeting its responsibility to supply the power requirements of the people it

* Based on an address before the annual meeting of the Rocky Mountain Electrical League, Colorado Springs, Colo.

serves. During these times, the federal-power crowd pleads that all hydro-electric sites "belong to the people." Who but "the people" are being represented when private enterprise takes on a hydro power project construction job?

The investor-owned utilities which are demonstrating their ability and willingness to build the Hells Canyon, the Mountain Sheeps and Pleasant Valleys, the Niagaras, certainly are responsive to the people.

They are owned by millions of men and women in every state of the Union.

They supply electric service to more than 41,000,000 customers—80% of all the electric users in the nation.

They are managed by local people who live in the area they serve and who are familiar with the problems and desires of their customers.

They are completely regulated by agencies and commissions whose sworn duty it is to represent the people and protect the public interest.

In fact, every decision made by the investor-owned utilities is based, directly or indirectly, on the question: "Will it benefit our customers?"

Development Hampered

This constant barrage of criticism and this constant opposition to every proposal for private development or partnership cooperation hampers the orderly development of our water resources. It means that power projects are delayed and the public suffers because the electricity they need is not available when they need it.

The government-ownership advocates make the claim that the federal government must develop these projects, so they fight every effort to create taxpaying, instead of tax-eating, programs. Yet when Congress clearly indicates that the federal government will not be permitted to build these projects—as in the case of the Senate vote on the Hells Canyon issue—they go right on fighting, obstructing, blockading.

Up in the Pacific Northwest, it is generally agreed that expenditures of almost $1,000,000 a day or over $300,000,000 a year are needed to keep up with the power requirements of the area. Congress has repeatedly refused to put the federal government into the power business to that extent in the Pacific Northwest, yet the government-ownership advocates bitterly oppose every effort of the investor-owned utilities to make sizable expenditures so that the area will have the power it so urgently needs.

Despite their cries of "giveaway" and "the people," these obstructionists don't really care about the people. They are perfectly willing to have the public go without electric power for as long as it is necessary, if they think it will bring them closer to the socialistic dream they are pursuing.

Tax Subsidy High

But perhaps the gravest and most dangerous consequences of following the course set by these government-power advocates is in the field of taxation. For, if we were to permit the federal government to monopolize the electric power production and transmission field and if we were to permit tax-exempt government agencies to take over completely from the investor-owned utilities, we soon would have a chaotic tax situation in this country.

Intead of private enterprise building power projects that broaden the local tax base and create more tax revenues for federal, state and county governments, we would have a greater tax subsidy than now exists and the ordinary taxpayer—people like you and me—would soon find that he could not raise his head above the enormous tax burden he was carrying. And we would be a long way down the road to complete socialism.

Today, on a conservative basis, government power in the United States enjoys a tax advantage or subsidy that exceeds $280,000,000 a year.

This $280,000,000 tax subsidy is enormous when translated into terms of power for the four-state area of Colorado, Wyoming, Utah and Montana.

The taxes lost through the exemptions enjoyed by these government-power agencies would build, each year, the equivalent of the Oxbow, Brownlee, Hells Canyon and Pleasant Valley hydroelectric plants, a total of 1,633,000 kw of power or almost as much capacity as now operated by all of the investor-owned utilities in the four states.

Or, on the basis of $150 per kilowatt for steam-electric power, this tax subsidy would finance, *each year,* 1,872,000 kw or 70% more than the amount of steam-electric capacity owned by investor-owned utilities in the four states at the present time.

The tax subsidy enjoyed by government-power agencies adversely affects all other electric consumers in two ways:

First—Because of tax exemptions, customers of these government-power agencies obtain their electricity at less than actual cost, and

Second—The general tax level, applicable to everyone, must remain high to finance the construction of federal projects and the facilities necessary to market government-produced power.

As long as tax-exempt power projects are built, the American taxpayers not only will be required to pay taxes on the electricity they use but their taxes must be stretched to help pay the power bills of the government-served customers who get special treatment.

Everybody Loses

Most Americans shrug their shoulders at the cost of federal power projects because they cannot actually see that their money is being used to build these structures. They take the attitude, "Why should we worry about a fight between government power and private power when the dam they are fighting about is half way across the country and won't affect us anyway?"

The truth is that the fight *does* affect everyone—and it affects him in his most vulnerable spot, his pocketbook.

The Tax Foundation has estimated that the taxpayers of Colorado, Utah, Wyoming and Montana account for 1.85% of the federal tax burden, based on actual tax receipts for fiscal 1955. Let's apply that figure to some well-known federal projects—actual and proposed—and see how it affects you.

Tax dollars from all parts of the country helped build the Tennessee Valley Authority, which has cost $1.9 billion, and the taxpayers of the four-state area in which we are located accounted for 1.85% of that amount. This means that the taxpayers of Colorado, Utah, Wyoming and Montana have a tax stake in TVA to the extent of $35,242,000.

Or take the Niagara project, which the investor-owned utilities of New York state, in the face of tremendous opposition, have offered to build and operate. Niagara's cost would be $400,000,000 and if the federal government were to construct it, our four states would put up $7,400,000 in tax money to help supply tax-exempt power for New York customers.

Or take Hells Canyon, where Idaho Power Co. is going ahead with a construction program that will save the U. S. taxpayers at least $357,000,000, which is the cost that would be required if the federal government built a high dam. More than $6,600,000 of that cost would have come from the taxpayers of these four states.

Federal development of all three programs—TVA, Niagara and Hells Canyon—would drain almost $50,000,000 from the taxpayers of this four-state area.

Taxes paid each year by the investor-owned utilities amount to approximately 5% of their investment in electric utility plant. Because federal

projects pay no taxes, the people lose revenue that would have been realized if the same project were built by taxpaying free enterprise.

In other words, every time the federal government invests $10,000,000 in a power plant that could and would be built by a utility company, $500,000 a year in taxes is lost forever.

Tax Extravagance

For many years, we in the utility industry have been deeply concerned about the problem of tax inequality and what that problem means to the future of our industry and the future of our customers.

However, the problem is much broader than a utility industry problem. It affects every taxpayer, every wage earner, every school child in the United States.

Wasteful federal spending and government encroachment in unfair competition with taxpaying utilities mean higher taxes, less freedom, less incentive and more inflation for every citizen. Unless we equalize the tax situation and remove the discriminatory tax advantages that a handful of agencies and people enjoy, we are on a direct road to socialization of the electric industry, and I am convinced that once you socialize the electric industry the socialization of many other industries will soon follow.

What is the solution? How do we stop this trend?

The answer to me appears extremely simple but difficult. To lessen the heavy burden of taxes and to stop the trend toward socialism, we must give new life, new incentive to our traditional American system of free enterprise.

We must provide a climate that will enable taxpaying investor-owned utilities to go ahead with the program they want to carry out—that of providing, for all the people, all the power they need. We must eliminate the unfair tax discrimination which now exists and we must support a local enterprise-partnership philosophy which will increase tax revenues of federal, state and local governmnments, instead of draining more tax dollars from the pockets of our citizens.

The investor-owned utility industry is ready, willing and able to carry its share of the load—and more. It needs only the opportunity to perform.

To create this climate, we must educate ourselves and our neighbors on the advantages of taxpaying companies performing the job to be done. We must call attention, at every opportunity, to the fallacies of the government-power argument and we must oppose, on every occasion, the obstructionist tactics of this group.

Conclusion

There *is* a "giveaway" in America today—it is a "giveaway" of tax benefits, a "giveaway" of personal and community dignity. It also is a "takeaway" of freedom and incentive, a "takeaway" of opportunity for every citizen in the United States.

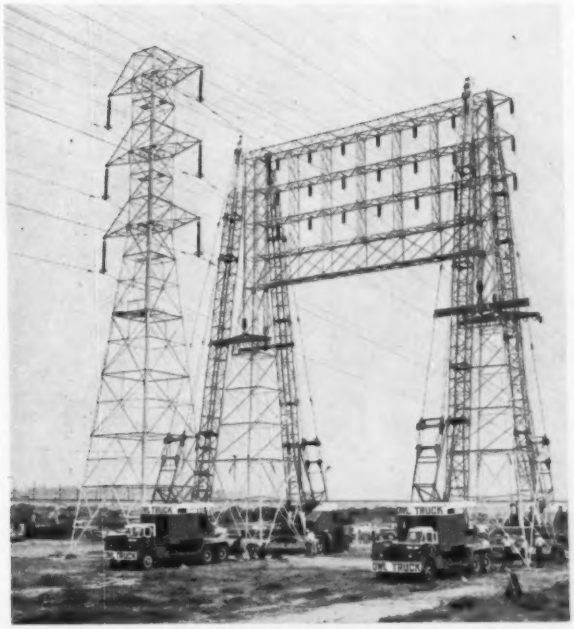
We have before us a tooth-and-nail battle between socialism and our traditional American system of free enterprise—a battle between economic slavery and liberty.

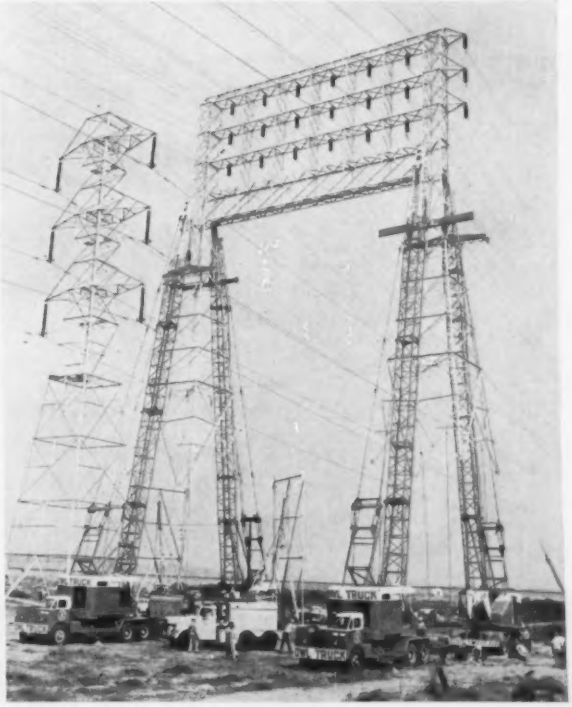
But I am convinced that the American people, if we give them the facts, will react as they always have reacted to truth and sound reasoning.

That is the job American industry has before it. We must give the facts to the American people and we must demonstrate why the people benefit when the jobs that need doing are done by free enterprise.

We have demonstrated we *can* do these jobs. We have demonstrated we *will* do these jobs. Now we must demonstrate that the best interests of the people lie in our *being allowed* to do these jobs. The prosperity, progress and future welfare of the American people depend on us.

Tower Gets Stilts





A 94-ft steel tower was lifted 32 ft in the air and fitted with stilts to provide for increased clearance over a railway roadbed. The delicate lifting job was carried out with five of the seven 66-kv circuits energized. The tower's drift was only a few inches while in the air. Careful planning enabled the Southern California Edison Co. crews to complete the job in an eight-hour shift

The problem is to load each of the units and plants on the system to achieve minimum over-all fuel input for a given system output. If you've ever wondered how the dispatchers do it, you'll enjoy this explanation of . . .

The ABC's of Economic Loading

F. R. Montgomery, Senior Mechanical Engineer, The Hawaiian Electric Co.

The economical production of electric energy is the most important phase of operating practice with respect to the generation, transmission and distribution of electric energy. Supplying system loads at minimum cost, consistent with good service, is one of the major aims of power dispatching. The art has become more exact and more exacting in recent years. This is particularly true when the cost of fuel progressively increases year by year. More accurate determination of economic dispatch curves for multistation systems is now possible through improved techniques in calculations and new developments in automatic computers.

The ability to attain and maintain economical production costs depends to a great measure upon the methods of allocating load, not only to the equipment in the power plant, but also to the generation stations of a single system and to entire systems interconnected through high-tension transmission lines. The power plant operator is confronted with the problem of selecting the equipment to be put in service and then of operating the equipment to obtain the greatest possible efficiency in production. The system load dispatcher, although primarily concerned with providing sufficient capacity to maintain continuity of service, is also concerned with the problem of allocating the load among the generation stations under his jurisdiction so as to obtain the highest system efficiency of production.

That load division between two or more machines does affect over-all economy of operations can easily be demonstrated. Consider two units (or two plants) operating in parallel to supply a common load. Depending upon the nature of the plant, there will be a definite relation between its input and output which can be graphically shown as input-output curves (see Fig. 1). Plant No. 1 has a maximum capability of 8 mw, while plant No. 2 has a maximum capability of 16 mw.

Cut and Try

The problem is to determine what the *output* of plants 1 and 2 should be in order that the combined *input* shall be at a minimum value. The first obvious method is the cut and try process. For example, suppose that the total output of plants 1 and 2 were 15 mw.

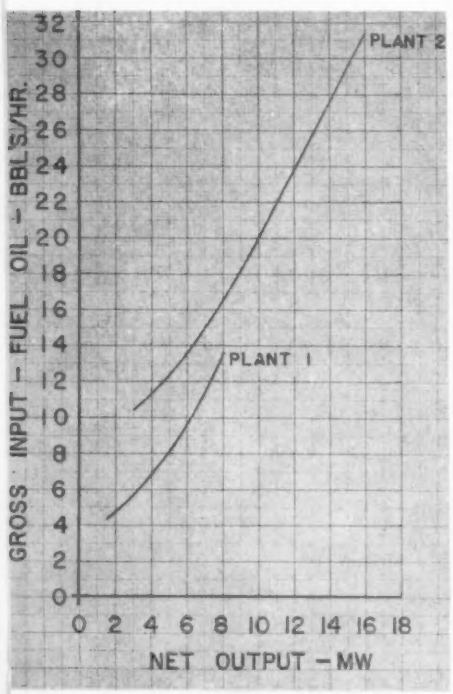


Fig. 1—Input-output curves for two plants

15 MW SYSTEM LOAD				
NET OUTPUT – MW		GROSS INPUT – F.O. – BBL'S./HR.		
PLANT 1	PLANT 2	PLANT 1	PLANT 2	TOTAL
2	13	4.7	25.6	30.3
3	12	5.7	23.7	29.4
4	11	6.8	21.9	28.7
5	10	8.1	20.1	28.2
6	9	9.6	18.3	27.9
7	8	11.5	16.6	28.1
8	7	13.6	15.0	28.6

Fig. 2—Cut and try to find the minimum fuel input for a 15-mw output with two plants

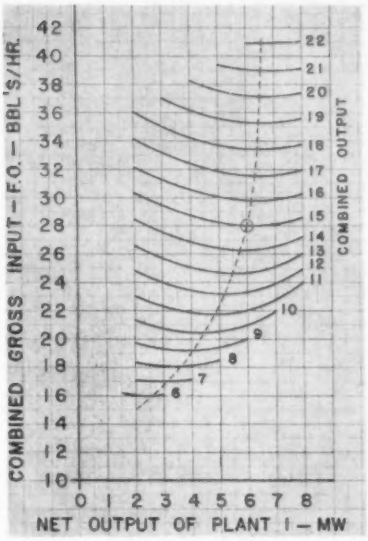


Fig. 3—Locus of minimum points shows load for plant 1 with total load of 6 to 22 mw

Then either machine could operate at any output ranging from 0 to 8 or 0 to 15, as the case may be. By tabulating all possible combinations of machine outputs and the corresponding total fuel inputs to both machines, the combination for the most efficient operation can then be selected as demonstrated on Fig. 2. Considering the two machines in question, at a system output of 15 mw, the most efficient operating point for each machine, that is, a point where the input is at a minimum, will be to load plant No. 1 with a 6-mw load and plant No. 2 with a 9-mw load. If this method were continued for all possible system loads and for all combinations of individual plant loading, it is possible to arrive at the outputs of each machine where the combined input is a minimum. By tabulating various loads similar to that shown on Fig. 2, a family of curves is obtained as shown on Fig. 3 which shows that, at a system output of 15 mw, the combined input is 27.9 bbl per hour. You will further note that the locus of the minimum points for the family of curves shows the most efficient combinations of plant outputs for system loads ranging from 6 to 22 mw.

On Fig. 3 the total input to both plants is plotted against the net output of plant No. 1. It can readily be seen that in terms of the loading on plant No. 1, the most efficient loading can be determined for plant No. 2 by reading vertically from the horizontal scale to the minimum load point for a given system load, and subtracting plant No. 1 output at that point from the total system load shown on the appropriate curve. By applying the above method to the two plants, the correct loading for each plant at varying system loads can be determined and plotted on loading curves. Fig. 4 represents the minimum loading for plant No. 1 and plant No. 2 for system loads between 6 and 22 mw. This pair of curves can be used by direct reading to load most efficiently these two plants.

Incremental Rate Curves

This process, although practical for application to two machines, is very laborious and for application to more than two machines becomes prohibitive. Load division can be solved much more readily by the application of incremental rates. This procedure is based on sound theory and can be easily applied regardless of the number of units involved.

The incremental rate curve of any given machine at any given output indicates the rate of change of input, that is, the rate of change of burning fuel oil with respect to output change. It does not represent the absolute efficiency or the absolute value of the input at that particular point. For example, refer again to Fig. 1, the input-output curve for plant No. 2, at an output of 10 mw. The input is 20 bbl per hour of fuel oil. If the output is increased to 14 mw, the input is increased to 27.5 bbl per hour of fuel oil. For an increase of 1 mw in output there is a corresponding increase of 1.87 bbl per hour in input. The increase in output is called the incremental output and the increase in input is called the incremental input. The incremental rate is defined as the ratio of the incremental input to the incremental output. The above mentioned incremental rate of 1.87 is the average value for the increment of output between 10 and 14 mw for this unit. The incremental efficiency is the reciprocal of the incremental rate, that is, one over the incremental rate. In this case the incremental efficiency is one over 1.87 or 53.5%.

The absolute efficiency of plant 2, when carrying a load of 10 mw, is 27.8%. This absolute efficiency is considerably less than the incremental efficiency quoted above as being 53.5%. It is very important to understand the distinction between the absolute efficiency and the incremental efficiency. The absolute efficiency gives the ratio between output and corresponding input, but does not show the efficiency by which this machine can take on additional load. The incremental efficiency gives the efficiency at which an increment of additional output can be obtained and will determine which machine can supply an increase in load most efficiently. For example, referring again to Fig. 1, plant No. 1 will produce 6 mw with a corresponding input of 9.5 bbl of fuel oil per hour, while plant No. 2 will produce 6-mw output with a corresponding input of 13.6 bbl per hour.

Now, when the system load is increased by 2 mw, the problem is to determine which machine can take the

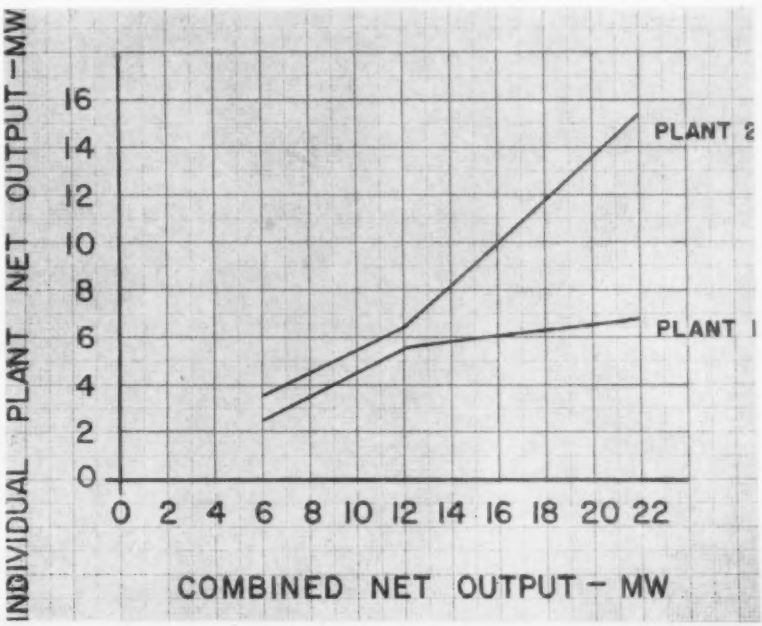


Fig. 4—Shows the load to be taken by each plant for any system load from 6 to 22 mw

increase so that the system input will be a minimum.

As plant No. 1 is producing 6 mw at 9.5 bbl per hour, and plant No. 2 is producing 6 mw at 13.6 bbl per hour, apparently plant No. 1 should take the additional load. This is not the case, however. When the load on plant No. 1 is increased from 6 to 8 mw the input is increased from 9.5 bbl to 13.6 bbl per hour, a net increase in input fuel of 4.1 bbl per hour. When the load on plant No. 2 is increased from 6 mw to 8 mw, the fuel input to plant No. 2 is increased from 13.6 to 16.4 bbl per hour, an increase of 2.8 bbl per hour as the machine picks up the additional 2 mw of load. It can be readily seen that plant No. 2 will produce the additional 2 mw of load at a rate of 1.3 bbl per hour less than plant No. 1.

The incremental rate for any machine may be derived from the input-output curve. A series of output values are chosen and the corresponding input values are read. The difference between the successive values of the output are usually made constant to simplify the calculations and are made small enough so that the characteristic shape of the incremental rate curve can be determined with accuracy. The incremental rate curve is merely a ratio of the input difference to the output difference, or the incremental input divided by the incremental output. In deriving the incremental rate curve by this method, it is assumed that the incremental input is a function of the midpoint between the two outputs chosen. The method of obtaining the points for plotting this curve is shown in Fig. 5. In this case you note that the increment of output has been chosen as 1 mw and that the incremental output is constant for all values chosen.

The total input for the load at each point is read in column 3. The difference in gross input for each increment of increased load is tabulated in column 4 of this plate. The incremental rate is then determined by dividing column 4 by column 2. In the fifth column the point at which the rate is to be plotted on the incremental rate curve is shown.

The incremental rate curve and the input-output curves are shown on Fig. 6. This incremental rate curve has been plotted from the data shown on Fig. 5. Note that each plotted point is assumed to be at the midpoint of the increment of load under consideration. The Delta I and the Delta O shown on this curve is tabulated in Fig. 5 and entitled, "Incremental Input and Incremental Output," as previously explained.

Use of Rate Curves

To demonstrate the method of using incremental rate curves for economically loading a three-plant system, consider Fig. 7. Fig. 7 repeats the incremental rate curve, which we have just derived for plant No. 1, as well as the incremental rate curve for plant No. 2 and a typical incremental rate curve for a diesel engine generator. It is assumed for this discussion that the minimum load for plant No. 1 and the diesel plant is 2 mw and that the minimum load for plant No. 2 is 3 mw. We will impose a further requirement that plant No. 1 and plant No. 2 take the entire load until the system output is 12 mw, at which time the diesel plant will be put on the line.

A combined incremental rate curve is derived by adding the two plant incremental rate curves and getting the combined output of the two plants for equal incremental rates. That is, as an illustration, at an incremental rate of 1, plant No. 1 should be carrying 2.5 megs and plant No. 2 should be carrying 4 mw for a total system load of 6.5 mw. You will note that the combined rate curve crosses the incremental rate of 1 at 6.5 mw and so on.

We are now in a position to state a general rule for using the incremental rate curves. *When two or more machines are operating in parallel to supply a system load, the maximum overall efficiency, that is, the minimum combined input for the given combined output, is obtained when the machines are operating at outputs that correspond to equal incremental values.** In Fig. 7 note that for any given system load from 5 to 12 mw the distribution of load for plants 1 and 2 can be determined. As an example, for a system output of 12 mw, plant No. 1 should be operating at 5.3-mw output while plant No. 2 should be operating at 6.7-mw output.

As previously mentioned, at 12 mw it is assumed that the diesel engine generator is brought on the line and immediately picks up 2 mw of load, thus reducing the load on the other two plants proportionately. At a point just after the diesel engine generator is brought on the line, say at a system

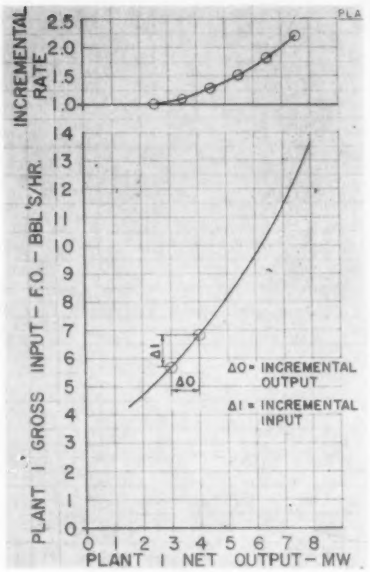


Fig. 6—Incremental rate from data of Fig. 5

TABLE 2 – PLANT I

NET OUTPUT MW	INCREMENTAL OUTPUT	GROSS INPUT F. O. BBL'S./HR.	INCREMENTAL INPUT	INCREMENTAL RATE = INC. IN / INC. OUT	OUTPUT AGAINST INC. RATE PLOTTED
1					
2		4.7			
3	1.0	5.7	1.0	1.0	2.5
4	1.0	6.8	1.1	1.1	3.5
5	1.0	8.1	1.3	1.3	4.5
6	1.0	9.6	1.5	1.5	5.5
7	1.0	11.4	1.8	1.8	6.5
8	1.0	13.6	2.2	2.2	7.5

Fig. 5—This table shows incremental rate as the ratio of incremental input to output

* This rule is based upon three conditions: (1) That the input-output curves are continuous; (2) that the first derivatives of the input-output curves (the incremental rate curves) are continuous; (3) that the value of incremental rate always increases as the output increases.

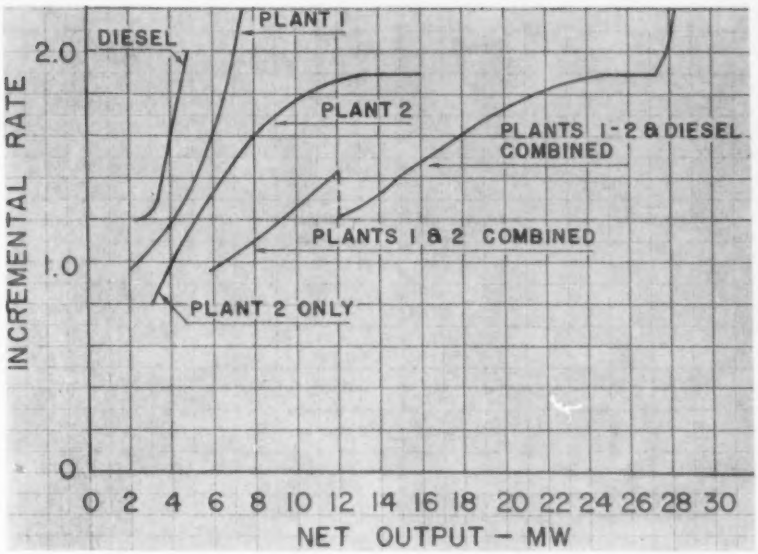


Fig. 7—Incremental rate curves for plants 1 and 2 and a typical diesel plant. The combined rate curve is made by adding the net outputs of the plants in operation

load of 12.2 mw, you will note that the diesel engine generator will be handling a load of 2.8 mw while plant No. 1 is handling a load of 4.1 mw and plant No. 2 is handling a load of 5.3 mw.

As system load increases from 12 to 27.4 mw, the three machines will be loaded in accordance with the load division as shown on the various incremental rates. At 27.4 mw, plant No. 2 is fully loaded and any additional system load above this point out to the maximum system load of 28.2 would have to be put on either plant No. 1 or the diesel as the case may be. In this particular area you will note that the slopes of the incremental rate curves of both the diesel and plant No. 1 are almost equal and the rate of increasing load on these two units would be almost equal up to the point where each unit is completely loaded.

Incremental rate curves for individual units similar to those shown on Fig. 7 can be used for determining the correct load division between various plants on a system, but the above example shows that this would be somewhat laborious for the system dispatcher. To facilitate the dispatching of load to various units on a system, loading curves can be developed from the previously illustrated incremental rate curves for a given system load with a given number of units supplying this system load. Fig. 8 shows the load division for the three units illustrated in Fig. 7 loaded to obtain the most economical operation for this particular system. Their individual plant net outputs are plotted against net system output. The data required for plotting these curves are obtained from Fig. 7 in a manner similar to that illustrated previously by selecting a given system load and determining the correct load division for the three units, such that the incremental rate for the three units has an equal value at that particular system load. This load dispatch curve can be used by the load dispatcher, either at the generating station or at the dispatch office as the case may be, to readily determine the most economical load division for the three plants for all given system loads.

By plotting the additional incremental rate curves for additional units which are added to any given system, and from this information obtaining a dispatch curve similar to that shown in Fig. 8, incremental loading can be easily applied to any size system with any number of generating units. This provides a quick, accurate method of determining the most efficient load division between multiple units in any system.

We have discussed at some length the theoretical aspects of the problem of load division between multiunits on a given system. Although incremental loading is recognized as fundamentally the correct basis for loading equipment and is used by many large utility systems today, we must not forget that incremental loading does not offer the solution for all problems involved in system operations. *I wish to emphasize that the incremental rate curves consider units only after they are in operation on a given system.* These curves will not determine for the operator, or the load dispatcher, the correct time to put a unit on the line or take a unit off the line. These are considerations which must be dictated by capacity requirements, transmission requirements, overhaul schedules, and all of the other many aspects which must be considered in operating a generating and transmission system. The necessity of operating various units at various times will vary from system to system and it is not possible to set down a general rule for scheduling unit operations so far as taking them on and off the line is concerned.

So much for the ABC's.

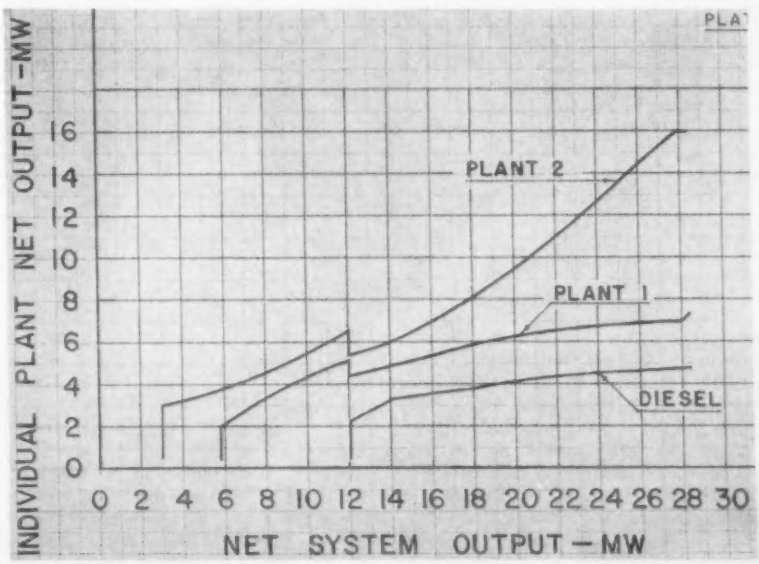
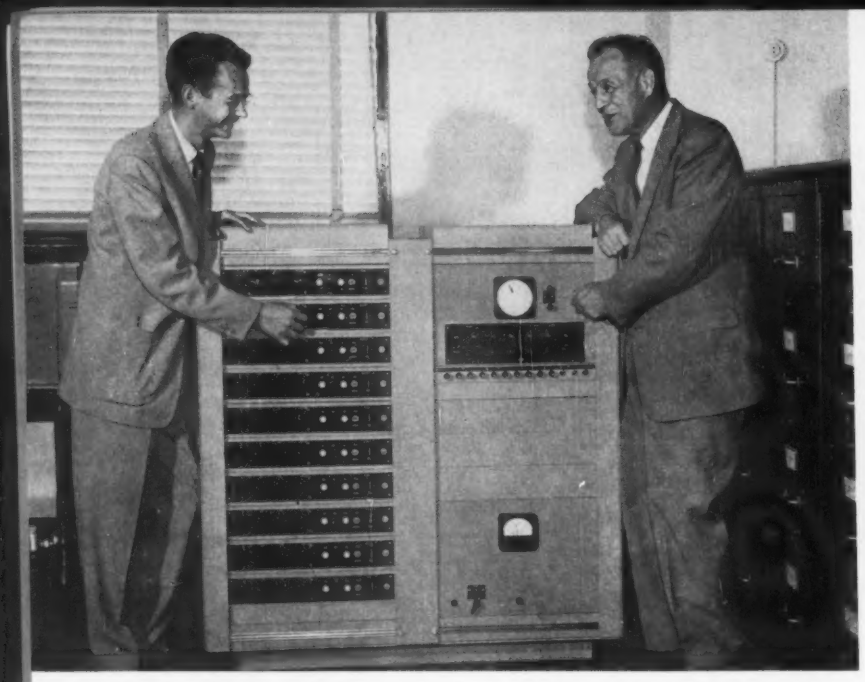


Fig. 8—Dispatch curves such as this provide a quick, accurate method of loading plants



EGAD is shown with its inventors, D. O. Ballinger (left) and J. L. McKinley. Machine was designed to be operated from a sitting position at system dispatcher's desk

EGAD! What a Machine

J. L. McKinley and **D. O. Ballinger,** Public Service Co. of Colorado, Denver

Staff Engineer — Electrical Engineer*

EGAD, the Electronic Generation Assignment Device, is in service for the electric power system of the Public Service Co. of Colorado at its dispatching headquarters in Denver, Colo. EGAD is an economic dispatch computer of the analog type. Aside from ably computing the economic dispatch, EGAD has become a valuable engineering tool for use in system planning, since proposed generation can be "plugged in" and its effects on the system studied under various loading situations. EGAD is a versatile machine that can accept additional power sources by the addition of a generator panel and simple connections to the control console. EGAD can be easily modified to operate automatically as a direct load control device actuating the turbine governors since its computation results from raise and lower impulses. In addition, EGAD can evaluate incremental transmission losses and plans have been made to add transmission loss circuits at the time when additional generating capacity at a distance from the Denver load center makes transmission losses an important part of the dispatching problem.

EGAD is the only machine known to recognize turbine back pressure in its computation. It also displays spinning reserve and the current cost of generation in mills per incremental kwh.

Conventional Dispatch Limitations

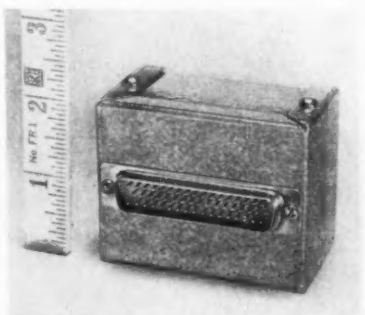
Loading economy has been given a good deal of attention on the Public Service system for many years. Prior to the development of EGAD, dispatchers used the conventional type of dispatch curves for loading generators. With an increasing number of generating units, with widely varying fuel costs and with a varying complement of generating units available because of scheduled maintenance, the number of dispatch curves required becomes formidable. Use of the conventional loading slide rule and dispatch curves brought the system close to the most economic dispatch but the effect of minutely varying fuel costs, oftentimes within the same station, or turbine back pressure was of necessity overlooked, or a guestimated correction made.

For example, the significance of turbine back pressure in the economic dispatch is frequently overlooked. Changes in heat rate from 1 to 4% or more can result without being reflected in conventional loading practice. EGAD recognizes all these factors and instantly computes the economic dispatch.

* Now with Superior Distributing Corp.

EGAD Aids in Planning

All of the variables associated with each generating unit, such as incremental heat rate curves, back pressure correction factors and load limiting devices, are built into a 50-terminal plug-in box mounted in the rear of each generator panel unit. This tiny device makes it possible to use EGAD in system planning. (See photograph.)



These plug-in units are interchangeable and therefore the economics of proposed additions to generating ca-

pacity can be investigated on a simulated in-service basis by interchanging these plug-in units. It is admirably suited to make planning studies for predetermining generation schedules since the incremental energy cost in mills per kilowatt-hour is continously displayed on a meter in full view of the dispatcher. For example, the costs of generation with or without a specific generating unit in service can be readily determined and an accelerated maintenance schedule can be quickly evaluated. The imposition of load on a group of less efficient generating units by reasons of schedule maintenance on one of the company's 100-mw units obtained an allowance in excess of $3,000 per week to shorten the down time.

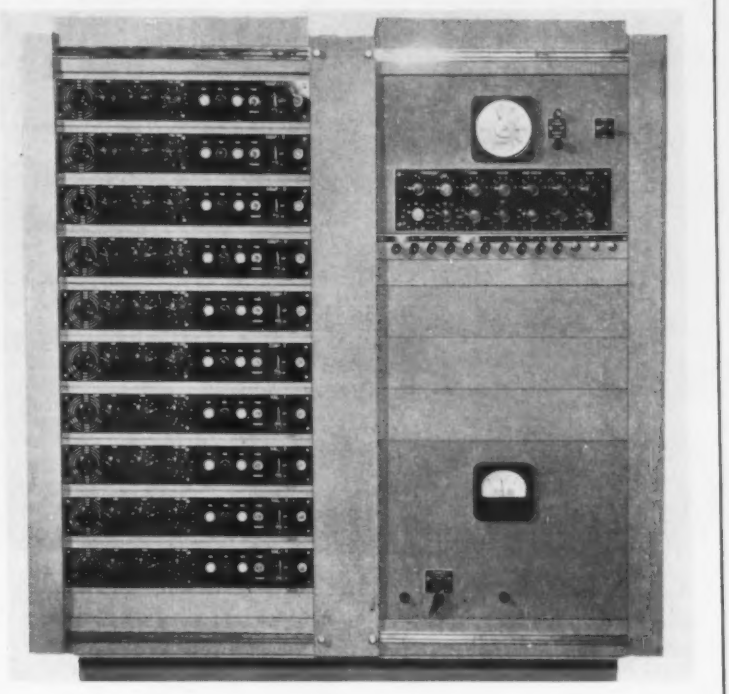
Planning studies can be made from simulated system operations by following the system load curves as projected for any period and directly reading the incremental cost of energy for the projected load. EGAD thus enables system planners to study the effect of anticipated loads on anticipated generating units. The long-term economic results are obtained on marginal situations such as the decision on higher operating pressures and larger units vs less efficient units and lower investment per unit of capability. This is a timely consideration unless the system can be so operated that all peak loading on the larger generating units will present no problems and will incur no operating penalties. Spinning reserve instantly computed for any loading condition will assist in scheduling the economic dispatch over the period of the planning study.

The Value of EGAD

It is extremely difficult to assess the value of the constant surveillance which EGAD supplies in an already well-regulated system. One way would be to look forward to the time when new generating units would add new complications to the dispatch problem. Another would be to consider the additional saving possible if EGAD is used for automatic dispatching. A conservative estimate by officials of the Public Service Co. indicates savings of approximately $50,000 annually.

Two other tangible benefits have been observed. EGAD has proved that it is a rugged instrument, requiring few adjustments and a minimum of repair. This sustained accuracy and ease of operation are doubtless reflected in more accurate dispatching and easier training of personnel.

Perhaps the best praise given EGAD and its designers is the interest of other utilities in putting EGAD to work on their systems.



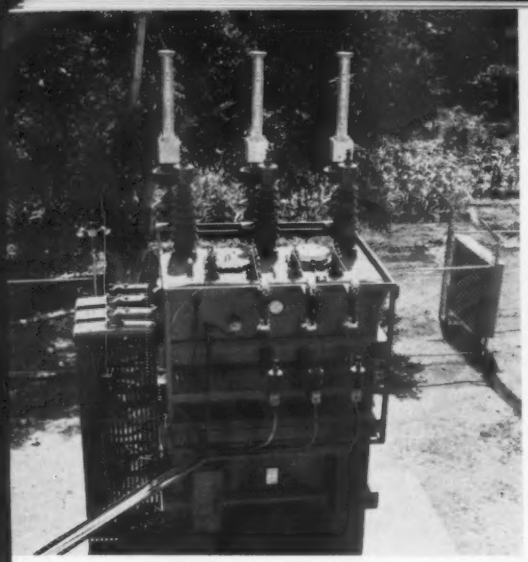
EGAD Makes Dispatching Easy

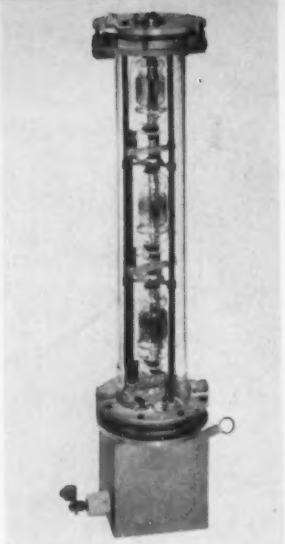
Pull up a chair and try your hand at dispatching on the Public Service Co. of Colorado system. The job is a snap with EGAD as helper. The first job is to fill EGAD in on what is going on in the system. First, turn on the generator panels for each generator that is available for service during your shift. Check the maximum and minimum load range dials, which are probably set properly from the previous shift. Make certain that the fuel cost in cents per million Btu is representative for the fuel being used and the particular fuel cost in each of the stations. Perhaps you should check this with the operators at each of the stations involved and at the same time get the turbine back pressure settings for each of the units you will be using. Set the switch for fixed or variable loading. This completes the "knowns" for each generator, which may vary. The rest of the information has been built in each generator panel. This completes the setup except for information regarding sources of power not entering into the economic dispatch computation. Information on purchased power, hydrogeneration or interchanged power is cranked in on the dials of the control panel. Interchanged power transfer may be set on a "net" basis or separately as interchanged in, which subtracts from the system requirement, or as interchanged out, which adds to the system requirement, since this power must be generated on the system and applied to the interconnection.

Now, using the raise-and-lower switch to the right of the main megawatt meter, bring the pointer to the present system megawatt reading. At this point EGAD requires a microsecond to study the problem. Now read the economic dispatch for any single generating unit by depressing one of the "read-out" buttons associated with each generator panel. This gives you the economic dispatch for any of the machines on the line. Pass this information along to the station operators and pour yourself a cup of coffee.

As the load changes, you will want to check the system load against EGAD's computation.

EGAD! Dispatching is easy!





Three Jennings Radio Mfg. Co. vacuum switches are shown mounted on the high side of the 4,500-kva, 60/12-kv transformers that supply power to the Jennings testing laboratory. The switches, which are used for load break service, are mounted within a high-strength glass enclosure. The actuating mechanism is at the bottom of the column and the unit is supported on a light-duty bracket on the tank

Vacuum Switch at Work

Ever since the announcement of the vacuum switch (EWEST, July 1955), engineers have debated the merits of this challenging new product. The pros have pointed to the ease of switching capacitors, line dropping, the interruption at first current zero without restrikes, the low cost and low maintenance. The cons scorn the switch, recalling the adage that "nature abhors a vacuum." They point to the lack of fault-interrupting ability as well as the absurdity of allowing a glass bottle to protect a power circuit. Between the blacks and the whites there is a growing area of grey. For example, there are three switch manufacturers building complete equipments utilizing the Jennings Radio vacuum switch. They include: (1) Schwager-Wood Corp.; (2) Delta Star; (3) High Voltage Equipment Co. The General Electric Co. now offers a vacuum switch for high-voltage capacitor switching.

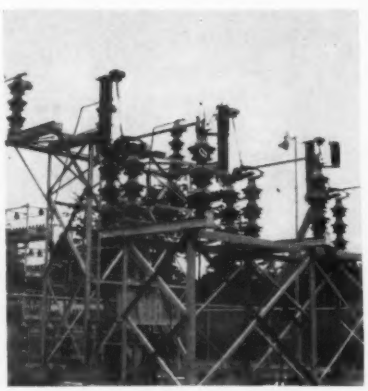
It is important to notice that many utility companies are gaining first-hand information by installing vacuum switches on their systems. Some of the installations are:

115 and 138 Kv

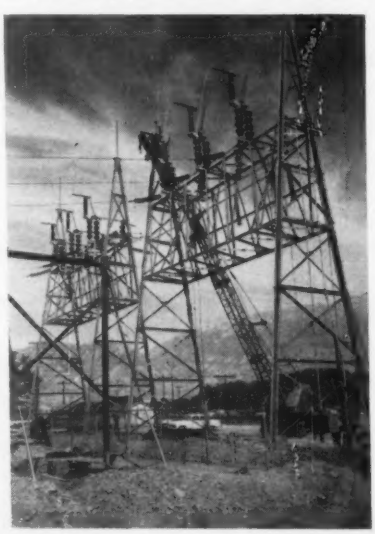
California Electric Power
Texas P&L
Utah P&L
Union Electric
BPA

15 to 69 Kv

Kansas P&L
AG&E
BPA
Bureau of Reclamation



Jennings vacuum switches incorporated in complete switch equipments such as this are becoming commonplace with utilities



In addition, sales figures on the switches show that hundreds of applications have been made in the d-c field up to 50 kv and thousands of a-c and d-c vacuum switches have been used at voltages below 15 kv.

Far from anxious to rush into the field with wild claims, the switch manufacturer feels that conservative application is the key to healthy growth. Recent operating experience indicates that initial current ratings have been overconservative and that the number of operations possible at high currents in effect give the switches *load break as well as limited fault-interrupting ability*. Taking note of this, users have been applying vacuum switches in lieu of circuit breakers.

←CAPACITOR SWITCHING

In a 115-kv capacitor switching installation on the BPA system at Bandon, Ore., a Schwager-Wood switch was installed back to back between two 10,000-kva capacitor banks. Short-circuit duty was such that acceptance tests of 2,500 amp at 97 kv for five operations were required, followed by 50-amp capacitor switching at 115 kv. The switches were tested at the Jennings power laboratory and proved satisfactory in all respects. These were switches with a published rating of one operation at 2,000 amp going beyond five operations at 2,500 amp.

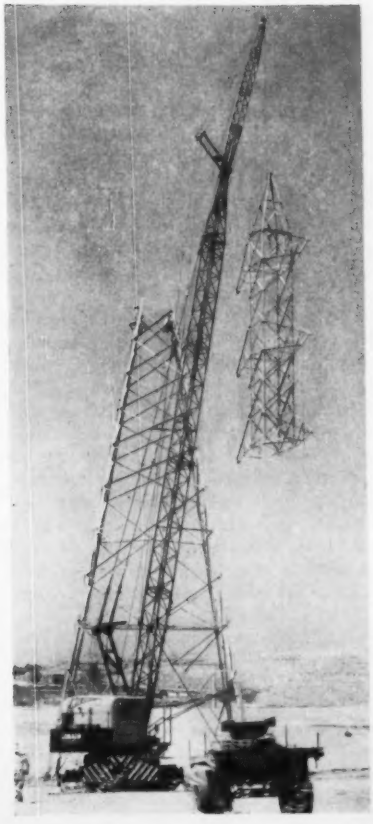
←LOAD SWITCH

Utah Power & Light has installed three motor-operated switches at a steel mill to give increased service continuity with a preferred and emergency throwover switching arrangement. These switches will be required to drop 40 miles of 138-kv line and interrupt the mill's load current. Tests indicate that these switches should be good for 2,500 operations at 600 amp or ten times the published rating.

Jennings Radio engineers are reserved on future vacuum switches. "Our new testing facilities with an available of 680,000 kva at 60 kv proves that we are in the power switching business for good . . . We don't want to introduce a switch that is just a little better—our next switch will be a big advance."

Mighty easy to sit at lunch, comfortably overweight, and philosophize that "people don't enjoy hard work like they used to." If this is the case, Carl (Duke) Putnam didn't get the word. Duke bosses tower construction for Collins Electric, building 115-kv towers from Folsom Dam to Sacramento MUD's Hedge substation. This is the story of Duke (shown on the tower), his men and their savvy and hard work. It happened because . . .

Duke Didn't Get the Word

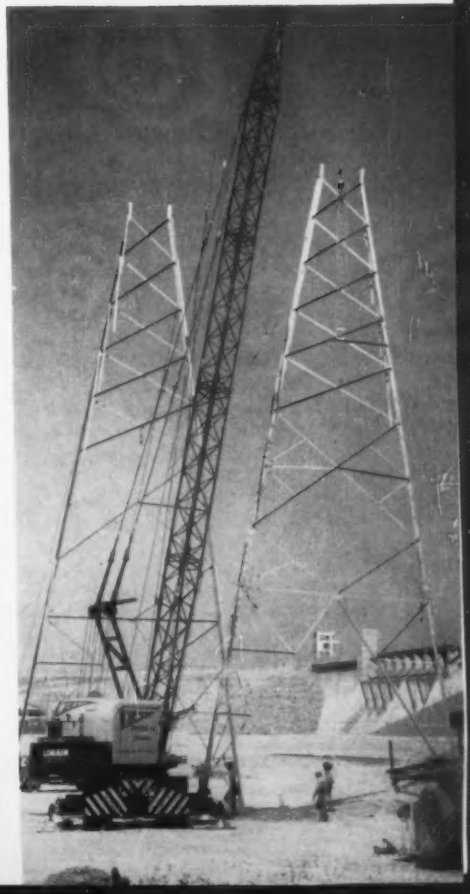


Construction starts on the ground with crews loading steel on the trucks so that it will be unloaded in the field in assembly order. Ground crews wade into the job of assembling the side panels. Another crew completes the cage, even to mounting insulators. The ground work takes Duke's men nearly a day, but is one of the keys to time savings during erection.

With major components completed on the ground, the erection crew with a 135-ft crane takes over. First, opposite side panels are set on their footings and braced with guy lines. Then a man goes up each leg bolting cross braces between each of the two panels. When they arrive at the top, the crane is waiting for them with the completed cage. Six bolts later Duke gives the word and the crane operator releases the rigging, saving a 40-ft trip to the peak of the cage for unhooking. The tower is in place. Elasped time: 25 minutes. The erection crew heads for the next tower.

A second crew goes up the tower putting on the finishing touches and tightening up the whole structure. Six tons of steel, 439 parts, 1,200 bolts have become a transmission tower.

"Let's skip dessert today."



Cage is lifted into place as a unit after the side panels are set and cross braced

Last Article on Grounding—Center of Confusion

It Gets More Complex—Not Less

Tom Hughes, Electrical Engineer, California Division of Industrial Safety

The reader must understand that the subject of electrostatic charges and cures is complex and tricky. This article makes no pretense of trying to instruct anyone in the accurate determination of source or cure.

There are men who have spent a lifetime in working with these problems for oil and chemical companies, etc. Such experts should be called in where the problem is complex or the possible damage or hazard is critical. On the other hand, where the trouble is just of the nuisance variety and equipment not complex, one can experiment with possible cures and judge his results by use of an electrometer.

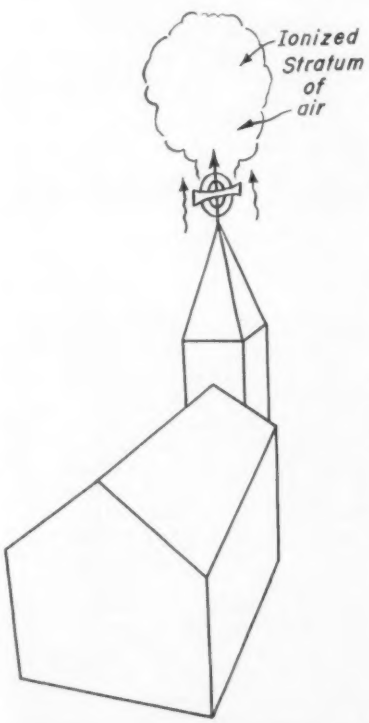
So far, we have discussed only the simplest means by which electrostatic charges originate. Let us now state the principle that wherever drops or particles of any fluid or pile of substance (whether conductive or nonconductive) are separated from the main body of the substance by dropping or being blown through nonconductive atmosphere they leave one charge on the main body and place the opposite charge on the body they join.

This applies to rain from clouds, water falls, dust storms, streams of dust or fibers being blown from pipes, etc. Dripping mercury has been shown to produce as much charge as dripping water. Dripping or falling particles, passing near or through an isolated or insulated body during their descent, will leave a charge on that body. Jets of air or steam impinging on an isolated or insulated body will charge it. This is most effective where the jets issue from a very small orifice or leak. Grain and other bulk products blowing over metal will leave a positive charge on the metal.

Jets of dry steam, issuing from tiny leaks in steam lines, are very deceiving because, being invisible in warm atmosphere, their reach is not discernable. Thus they often impinge on an isolated object and build up a charge upon it without observers realizing they were reaching that far.

Occasionally we investigate cases where people have received shocks from electric drills, buffers or high-speed routers held in the hand. The supply cord may or may not have had an additional grounding conductor. After the shock the tool was inspected and tested in the shop but no fault was found in the wiring. The person was dry and free from grounded objects at the time. Reconstructing the circumstances, a setup similar to the following will usually be found.

The tool was being used on some isolated substance such as a plastic panel or table top. A strip of metal (also isolated from ground or other metal) was firmly attached to the panel and acted as a good receptacle for gradually accumulating charges from the plastic. The metal case of the tool accumulated an opposite charge. When the operator casually came into contact with the metal edge or strip with one hand or arm, while holding the tool in his other hand, the charges were neutralized through him. A fiber sanding or buffing wheel, used on bare metal, can isolate charges on the metal under the right set of conditions. Again we must point out that these shocks occur whether the tool has a ground wire attached or not.



During a storm the charged atmosphere draws charges up the steeple from the ground. These are ejected at high velocity from the lightning rod, relieving stress

One of the most harrowing experiences of simple static we have heard of happened in a quarry on a large power shovel fed with 2,300 v. A crew had just completed servicing machinery on the shovel with the power turned off back at the source and had sent a man to turn on the current. One worker was down on the ground (2 or 3 in. of dry dust that had had no moisture for several months) scraping a heavy layer of accumulated grease and dust off of parts of machinery near the ground with a metal scraper.

Suddenly he jumped and yelped that he had been shocked. Other workers rushed word to the man at the switch to turn off the current but it is believed that he had not actually turned it on when this happened. The scared worker was examined for burned marks but none were found and there was nothing wrong with him. The machine was tested and no fault found on it. The only explanation was that in scraping heavy layers of nonconducting accumulation on the machine he had placed a charge on his body and one on the machine of opposite polarity and finally moved his arm near enough to the machine for a spark to jump.

There are several points illustrated here. In the first place the electrostatic field existed between the man doing the scraping and the machine and did not affect other men around. The ground and the air (in this desert region) were both absolutely dry and so isolated the man from the machine while the charges evolved on the two contacting substances—the scraper and the gummy accumulation. Damp ground, damp air or a bond from scraper to frame would have prevented it.

Another simple illustration of a different type is found in laundries when the atmosphere is right. Sheets come off the flatwork ironers with heavy charges on them. If the two girls who fold them are standing on insulated mats or wooden duck boards they will find sparks jumping between them or

from them to the machine. In this case charges are being steadily fed to them by the moving sheets and a field is established between them and the machine. At the same time, if one of the two loses part of her charge, that gives her a different potential from the other. The one with the highest charge can induce an opposite charge on the other and a spark jump between them as well as to the machine.

The usual cure is to use a conductive rubber floor mat although the type of soaps and starches used affects the amount of charges generated. If the new mat is on damp concrete floor the charge will usually dissipate but if it is on a dry wood floor it should be bonded to the machine by use of a metal screen under it.

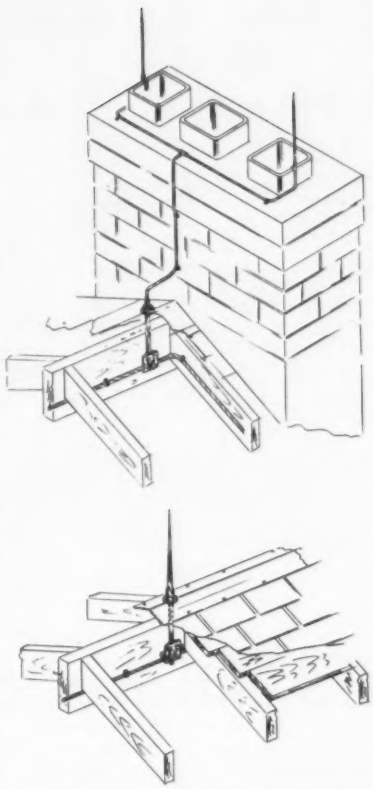
The more complex problems rise from induced charges on objects within the static field. A charged body passing another body (whether the other body is grounded or not) can induce a charge on it. A heavily charged cloud, for instance, creates a field between it and the ground that draws a charge of opposite polarity up into all elevated objects or hills.

Suppose there has been no rain and the air is dry. A heavy charge is induced on a truck standing on rubber tires. The cloud discharges through lightning to a nearby hill and its static field collapses, leaving the heavy charge stranded momentarily on the truck by its dry tires. In other words, there is a potential difference between truck and ground of several thousand volts. A person approaches the truck in rubber boots; the truck induces an opposite charge on the person and they form a capacitor. If, on the other hand, the person has on wet conductive shoes and the ground is conductive, the charge from the truck will dissipate through him to ground and probably kill him.

Some Simple Curative Measures

These examples are told to illustrate the complexity of the problems involving electrostatic charges. We have just touched on some of the simple ones. A whole book could be written on the more complex problems existing in tanks and pipeline systems around refineries and chemical plants or material handling equipment and ducts around grain mills and food processing plants.

These problems, where flammable or explosive atmospheres are concerned, must be solved by experts. Bonding of all metal parts is usually a first corrective measure but this is not always the final answer. Where liquids are dumped into tanks above the surface, agitated by air, or even where pipes injecting the liquid below the surface cause turbulence, explosive atmospheres above the surface have been known to ignite in spite of the fact that everything was bonded.



Typical modern installations of short lightning rods on residence roof ridge or chimney

One sure method of preventing explosions in complex situations is to dilute the atmosphere with an inert gas such as nitrogen or carbon dioxide, or flue gas from boilers after it has passed through a scrubber. In cases where these cheaper gases cannot be used, the more expensive helium may be the answer. In anesthesia, as an example, where pure oxygen is mixed with highly explosive vapors, helium can be used in an extreme situation to render the mixture nonignitible.

Belts on machines can be neutralized by conductive dressings or by neutralizers such as have already been mentioned. In bonding the parts of machines, it must be remembered that greased bearings are poor conductors. Copper or carbon brushes can be used to carry charges from moving shafts around bearings to the machine frame.

We have reached the end of this series entitled "Grounding—The Center of Confusion." In the three sections of the series we have tried to cover, briefly, the problems related to the theories of grounding. Our objective was to bring out the need for a comprehensive review of the whole picture by a committee of expert delegates from national electrical and electronics organizations.

Articles are published at frequent intervals, in various magazines, to try to educate the users of electrical equipment in the various aspects of the subject. The whole trouble is that the persons who need the educating are not the ones who read the articles. We have tried to show that the apathy of users toward education in this field is produced by the extreme simplicity that the term grounding suggests.

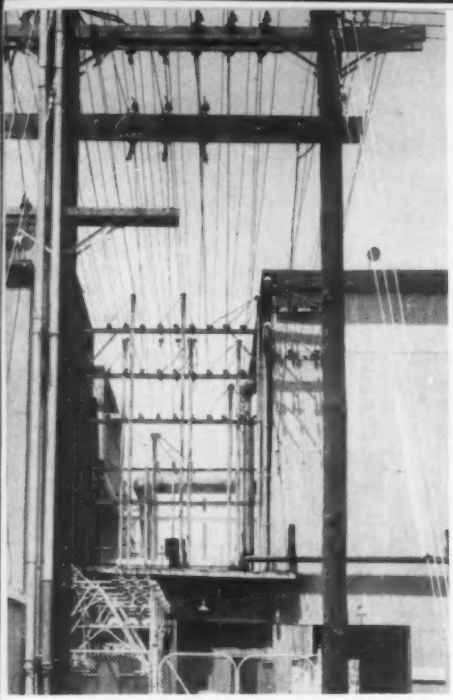
The needs and purposes must be thoroughly studied on a really academic scale rather than leaving the strategy and ball-carrying to purely practical men. With the increasing of automation, information gathering and sampling networks, etc., the confusion is going to get worse.

As the guided missile and rocket programs are getting into full swing in the large aircraft plants, grave misunderstandings and controversy are parting the ways of the plant electrical departments and the electronics departments. Normal electrical plug circuits, which have satisfied the codes and inspection authorities for years, are not working right for electronic testing and calibrating equipment as it moves out of the research and development laboratories onto the assembly lines.

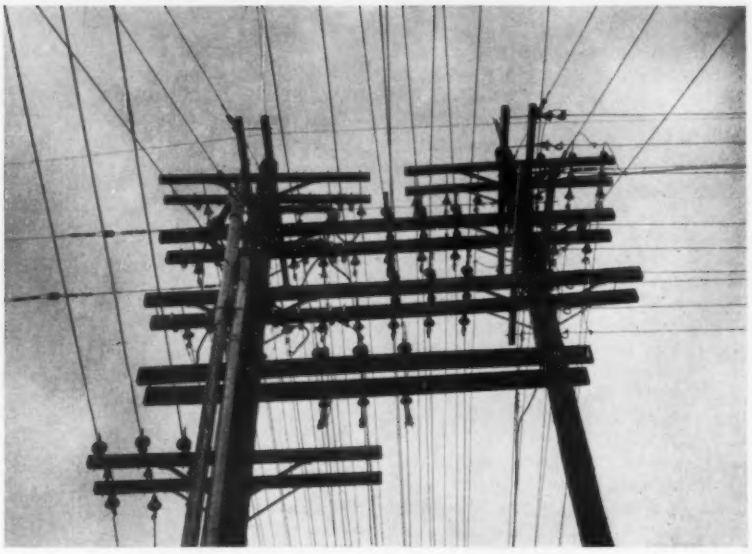
Shielding and filtering out spurious signals and transients from supply systems have long been a cross the sound man had to bear in solitude, if he wanted to tie on to them, but now proper accomplishment is becoming a matter of life and death to rocket-firing personnel. The picture is going to get more and more confusing unless everyone's needs in the modern plant are recognized and intelligently cataloged.

And not only must the grounding, shielding, fault-return path and other related problems be studied in the light of modern needs but we must discard obsolete terminology and recognize them under names that realistically express the objectives. Only then will the ordinary layman be willing to spend time in necessary study of the problems.

As an example of what we mean: Armistice Day had descended to the low of being just a holiday that we could work on our pet hobby while the poor mayors and public officials had to dress up and make speeches to empty town squares. Now that they have changed the name to Veteran's Day, it presents its real significance and we are called back to the sacrifices our veterans made in wars of the past.



Terminal structure is over switch house



Transition structure carrying three circuits in parallel with closely spaced phase wires

Units Speed Anaconda's Plant

Standardization of equipment, circuiting and even drawings reduced construction difficulties for Oberg Electric Co. of Salt Lake City and is making operation simpler and maintenance easier for the Anaconda Co. at its recently enlarged uranium oxide leaching plant at Grants, N. M. Oberg Electric not only did the installation but furnished the electrical engineering and supervision. M. E. Dansie, electrical engineer of the firm, did most of the engineering in the field, flying back and forth from Salt Lake City to Grants as occasion required.

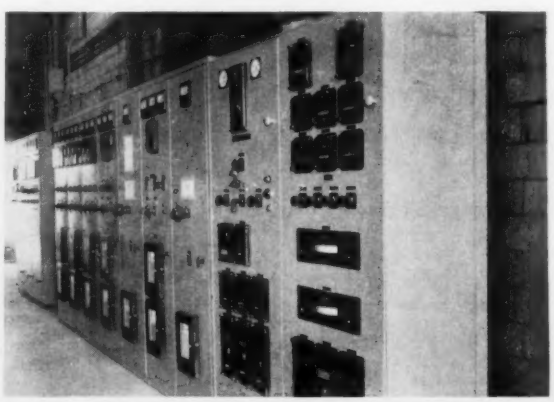
In this engineering, Dansie provided liberally for the future. To do so, he standardized wherever possible.

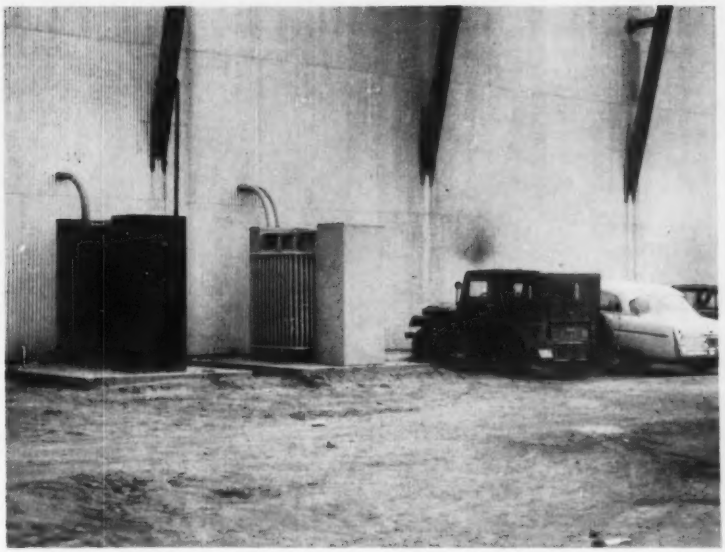
As examples, every motor circuit was wired for the full wire capacity of the starter. This provides for the future and also insures better operation of the thermal overload devices. Another feature was that individual conduit runs were used for various items of equipment rather than running larger conduit with maximum conduit fill. For flexibility, however, junction boxes were placed along the runs. These were common to a number of circuits and will permit future changes at a minimum of labor.

Wire sizes were kept to a minimum in variety. Color coding was completely standardized. Bus duct was used only in connecting the substations to the control centers. Sizes 1 and 2 starters were protected by Fusetrons; sizes 3 and 4 by circuit breakers. Unistrut was used for supports and hangers.

Each substation was given a number, usually a multiple of a hundred. Control centers were indexed to the related substation numbers. Motor circuits were given subdivisions of the control center number. Letters were used to indicate the general type of equipment or construction and related

Standardized fused disconnect combination and breaker start panels. Main 2.3-kv control board includes graphic meters





Two-unit substations just outside the wall, a 300 kva at left, a 750 kva at the right. Conduit racked under conveyor between subs

drawings in the final distribution were numbered consecutively for assembly into sets. While this increased the number of drawings, each was complete in itself without reference to other drawings for details. Densie felt that the tracing problem was less than that of correcting errors caused by workmen referring to the wrong detail drawing.

Standard diagrams were developed for all the motor and control circuits and shown in physical arrangement rather than schematic diagrams.

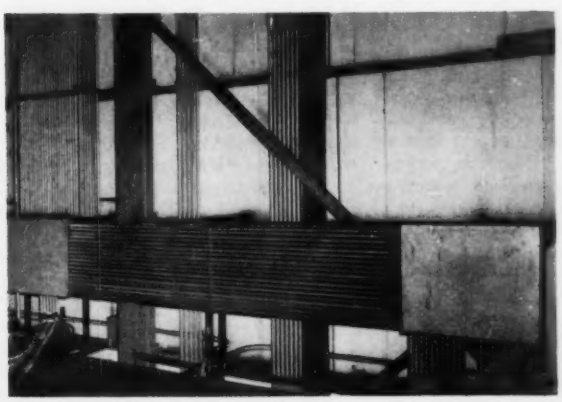
The project involved a number of interesting problems to be solved. One was grounding. In the dry New Mexico desert, rotary drilling equipment was used to sink 3-in.-diameter grounding wells to a depth of 120 ft, in all, about 25. Holes were cased in the soft topsoil with a fitting at the top to allow drawing the casing at any time. A No. 4/0 cable with a weight at the end was dropped to the bottom of each hole and salt poured into it. Where substations were close together, the holes were crosstied to provide a common ground for the area. Further cross connection between grounding holes was made through bonding of the static wire from the overhead outdoor distribution system at various points.

Power supply for the plant comes from two existing 700-kw steam-turbine generators and a 3,750-kva substation supplied from the 14.4-kv system of the Continental Divide Cooperative, REA. For the addition, the existing 2.4-kv switchboard was trebled in size. It now has 14 panels, which control and meter the incoming circuits from the REA substation, the two generators, nine outgoing overhead lines and two inside feeders. The main oil circuit breaker on the incoming line is rated at 1,200 amp. The remaining 11 are 600 amp. One of the inside feeders supplies the existing 1,000-kva substation and the other is for four compressors, totaling 750 hp. Except for some motors of more than 100 hp, wound for 2.4 kv, most of the motors are operated at 480 v. Lighting is 120/240 v, single phase.

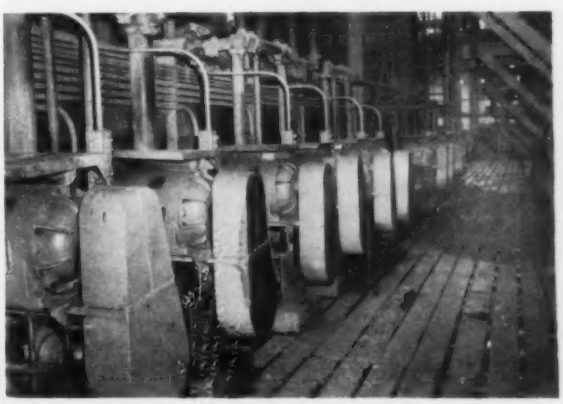
Outside Distribution

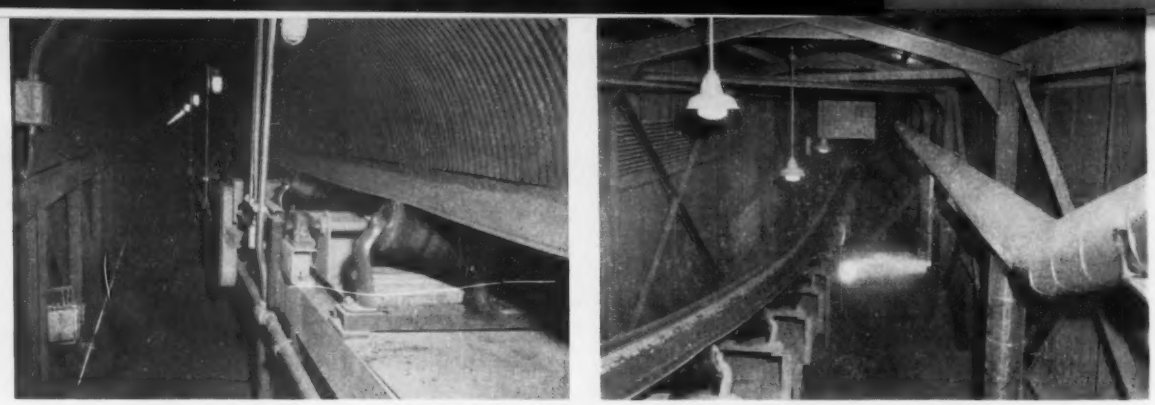
In the plant area, the 2.4-kv overhead circuits are carried on No. 4/0 bare copper. In the housing area, aluminum conductors with weatherproof insulation were used both primary and secondary. Pole lines were designed for two circuits to a crossarm. In order to keep line reactance to a minimum, phase wires were spaced on 18-in. cen-

Conduit pattern, some behind, some in front of girts for clearance and ease of tracing with junction boxes instead of bends at corners



Top conduits of this typical run are to pushbutton stations to each motor while lower conduits are for motor feeds from starters





Lighting fixtures on risers from belt frame where no roof support. Dust-tight fixtures on swivel mounts. Note racked conduit on wall

Office lighting with recessed troffers between rows of 2x4-ft removable tile sections

ters. Climbing space was about 3 ft. Crossarm spacing was standardized at 4 ft. Because of heavy loading, span lengths were held between 80 and 105 ft.

From the main REA substation to the main switchboard, three circuits are run in parallel. The take-off is from a modified H-frame with all nine wires in horizontal configuration. The phase conductors were strung on 8-in. centers with the phases spaced 36 in. Risers from two sets were phased out on a horizontal bus, strung two wires to a phase, near the top of the structure. The bus was connected to two conventional circuits occupying positions on the top and bottom crossarms. The third circuit was run directly from the take-off, up the structure, to the opposite end of the top crossarm. At the switchroom, each circuit was connected to a three conductor 500 mcm cable in 4-in. conduit for the run to the main circuit breaker.

To avoid long circuits or obstructions and for safety, overhead primaries went underground at three places into 4-in. fiber conduits, placed under grade in a concrete sheath. Overhead connections were avoided also at the substations, even if only to run the primary in conduit down a pole. Most primaries for substations actually did run underground below roads or otherwise. A continuous static wire, grounded at the transformers, was strung on pole-top bayonets, for lightning protection.

Control Center Systems

In general, the plan incorporated a complete secondary control switchboard near each substation. For better operating control, motor circuits to natural groups of processing stages were not divided between control centers. However, a manual transfer switch permits one power control center to be served from the main center at either of two other substations. An automatic transfer switch, with a manual preference selector, permits similar shifting of the plant lighting load in the same area.

The control centers themselves were assembled from standard units to suit the particular area or load. The main assemblies of G-E equipment contain a bus and built-in lighting substation, a main lighting breaker and a 24-circuit lighting distribution panel. The lighting substations are 480-120/208 v, three phase, wye. Units rated at 15 kva are three-phase transformers. Those at 30 kva consist of three single-phase units. Interchangeable draw-out type Trumbull units are used for motor circuits. Each motor cubicle contains a circuit breaker or set of Fusetrons, the starter, a 480/120-v control transformer, red and green lights, and a stop button. All motors can be stopped at the main control center. Starting must be done at standard control stations near the motors in proper sequence. Much of the materials handling for the plant has been mechanized and an error in sequence or direction would result in a waste of materials.

At each critical processing stage interlock controls, sometimes involving more than one area, were devised by Dansie to prevent operation unless the preceding stages were functioning. Interlocks also are used to prevent starting of one unit if the succeeding stage is not ready to go. All of this was standardized on drawings to aid not only the installation but the maintenance of equipment once installed. Similar ingenuity was required to develop an alarm system of both audible and visual signals. These were used to warn of high liquid level in a battery tank. A 24-v system fed from a transformer inside the Minneapolis-Honeywell relays is generally used in the alarm system.

All lighting units, with the exception of those mounted on poles, were located to make scaffolding or lamp changers unnecessary when relamping. Swivel suspensions were used in areas subject to vibration. Incandescent fixtures include RLM dome, prismatic reflectors and vapor-tight globes, with fluorescent lighting in the office areas where rapid-start, 40-w lamps are used.

New Portland Code Upgrades House Wiring Requirements

Considering the amount of argument over the installation requirements for built-in ranges and high-wattage electric clothes dryers, some provisions in the newly revised Portland electrical code are interesting. In a city with high appliance saturation and heavy average annual kilowatt-hour consumption per residential consumer, a lot of field experience is reflected in the provisions now written into the city's new code.

Portland always has written a complete code of its own, the last one being written 10 years ago. Many changes in the National Electrical Code and in materials and equipment have necessitated revision. While based on the 1953 NECode, the electrical department under Joseph Gray, chief electrical inspector, has added definitions and broadened the scope of the NECode to make very definite a number of questions regarding appliance installation.

In the past, Portland's leadership has often found itself reflected in later editions of the national code and the same may result from the present code.

A few of the important changes are given here. They are taken from the very complete report of J. S. Backenstos of the Portland department, who is the secretary of the Oregon Chapter, IAEI. These changes were explained at the Oregon Chapter meeting in Portland earlier in the year. The new code went into effect Oct. 1.

Branch Circuits

Total standard load is computed at 3 w per sq ft and at least one 15-amp branch circuit is required for each 10 amp or fraction thereof. A 20-amp circuit may be installed for each 14 amp or fraction thereof. One 20-amp branch circuit shall be provided to supply all basement lighting outlets and a 20-amp branch circuit independent of switch control is required for furnace or heating unit.

Cove and valance lighting or totally indirect lighting, if the lamp wattage exceeds 1 w per sq ft of the floor area or where yard or patio lighting is installed, will require one or more separate circuits computed from the specific load per circuit. A minimum of two appliance circuits, 20 amp, may still be used unless there is a party or family room, when an additional appliance circuit is required.

Where an electric range is installed, it is compulsory to provide capacity for an electric water heater. This circuit shall be not smaller than No. 10 for water heaters rated at 6,000 w or less. A manually operable switch or circuit breaker is required to control and disconnect the water heater and disconnect all ungrounded conductors of the circuit simultaneously.

For ranges, ungrounded conductors shall not be less than No. 6. The neutral of a three-wire range circuit may be smaller but have the current carrying capacity of 70%. If a plug outlet is provided, it must be 50 amp at least.

Built-in range units are required connected by flexible metal conduit between the range junction box and the terminal box of the range raceway, and conductors in such conduit must have an insulation rating of not less than 90 C. Frames of built-in range units are grounded to the grounded circuit conductor with wire not smaller than No. 10. Electrically heated clothes dryer circuits require No. 6 when installed in cable. If metal raceway is used, it must be ¾ in. or larger and conductors not less than No. 8. Dual-rated dryers are to be wired for the maximum rating whether the full wattage is connected or not. A switch or circuit breaker not a part of the appliance shall be used to control a circuit and act as a disconnect when the dryer is wired in solid or when connected by a pigtail and attachment plug that is not readily accessible to the user without moving the appliance.

Service Entrance 200 Amp

In either single or two-family dwelling of more than 500 sq ft, a 200-amp meter base and a 2-in. rigid conduit raceway between entrance head and meter are required. Neither 125- or 150-amp meter bases will be accepted, nor will bell reducers. The raceway must be 2 in. from weatherhead to the meter base. From the bottom of the base, a 2-in. run of conduit may terminate in a wire gutter, to be used only for a pull box and may terminate into 200-amp service equipment with six disconnects. Breaker handles must be not more than 1/16 in. apart to be accepted on multiwire branch circuits as one multipole disconnect, or be equipped with approved handle ties but breakers of the same polarity with handle ties will not be accepted.

Built-in dishwashers and garbage disposals are required wired in as fixed appliances to separate No. 12 wire branch circuits or both units to a three-wire No. 12 branch circuit.

Demands

Complication of demands for feeder sizing provides for ample capacity. For combined range (12,000 w) and water heater (6,000 w), total 18,000 w or less, name-plate rating, a demand of 14,000 w is required except in existing services where the combined rating is 15,000 w. In that case 11,000 w are required for that portion of the circuit which carries the combined lighting, appliance, range and water heater loads. Minimum electric clothes dryer demand is 5 kw where feeders also supply electric ranges of 8 kw or more. Other fixed appliances in dwellings, excepting ranges and space heating equipment, connected to the same feeder, have a demand factor of 75%.

No demand factor can be taken on electric space heating, used for heating purposes solely without any other means of heating the dwelling. The Portland code requires that space heating equipment be computed at 100% except that special permission may be granted where units are operated on a duty cycle. It further states that where electric space heating is employed as the predominant source of heat, the service and feeder conductor capacity shall be based on the kilowatt capacity required to offset the calculated heat loss of the living quarters of the dwelling in Btu per hour at design conditions. This is true whether the heating devices are installed in all the rooms in the initial installation. Where electric heat is not the predominant source, space heaters may be considered as fixed electric appliances and a 75% demand may be taken.

Thermostats controlling space heating are not used as disconnecting means unless they are marked with an off position and simultaneously open all ungrounded conductors in the off position. Further, each room or space heater may have a single disconnecting means for the total number of heaters if they are not more than 5 kw.

Another interesting requirement is for grounding in the nonmetallic

sheathed cable system. The Portland code requires grounding of all boxes and fittings. Hence it requires a grounding wire in the cable, made continuous from the neutral bus in the panel throughout the circuit, to ground each light, switch and receptacle outlet box or junction box in the circuit. The requirement is that grounding shall be by the use of a separate grounding screw not smaller than 8/32, tapped into the back of the box and located in a manner that can be readily reached with a screwdriver after the plaster finish is in place. The clamp screw in the box cannot be used for grounding purposes.

There are many more details as to differences between the Portland and the national code. These, however, involve wiring for appliance use.

NECode derating supported by new

Raceway Heat and Pull-in Study

Facts about heating of electrical conductors in steel raceways of various kinds, facts which may have important bearing on future conditions of the National Electrical Code, were obtained as a result of a study sponsored by the American Iron & Steel Institute as a public service to the industry and made by Underwriters' Laboratories Inc. The results of this study were made known in a paper presented at the American Institute of Electrical Engineers fall general meeting in Chicago Oct. 1-5. It is entitled "The Heating and Mechanical Effects of Installing Insulated Conductors in Steel Raceways."

The investigation was made because the steel institute wished to learn the effects of installation of more than nine wires in conduit or tubing and for the use of more than 20% of the cross sectional area of wireways and auxiliary gutters, since these were not covered in the 1953 National Electrical Code. However, the investigation went further than that by comparing all of the available data and information in order to correlate the investigation with existing data and to avoid duplication of work where there was complete information.

Since there were no data available on such raceways as cellular metal floor ducts and underfloor raceways or for more than nine insulated conductors in other types of steel raceways, this study will present the first information covering the latter. The results will be made available to National Electrical Code committees with a view toward improvement of code requirements.

The wire tables have been the subject of considerable controversy and the derating factors are ignored very generally. It is of interest that the investigation more or less substantiated the need for derating as outlined in the National Electrical Code tables. However, a new approach to the code tables is being suggested as a means of making them more practical and workable as far as field inspection is concerned.

The study was divided into two parts. Part 1 considered the heating of more than nine rubber or thermoplastic insulated conductors in steel raceways as the result of carrying current under various load conditions. Part 2 studied the mechanical factors affecting installation of more than nine rubber or thermoplastic insulated conductors in steel raceways of various kinds. The purpose was to compile data that could be used to analyze applicable current carrying capacity, reduction factors, the effect of load diversity on both carrying capacity and conductor operating temperatures. The second part was to find out what happened to conductors while being installed in raceways of various types, with differing numbers and sizes of conductors having a maximum of four bends in a run of up to 100 ft.

Used in the tests were rigid steel conduit, electrical metallic tubing, flexible steel conduit, steel wireway, underfloor raceway, cellular metal floor of two types and for further information thermal insulation such as fibered gypsum blocks. Types of wire tested were RH-RW and TW in sizes 14, 10, 6 and 1/0. Conduit sizes ranged from ½- to 4-in. sizes.

Complete cooperation was given by manufacturers, who provided the materials, and by the National Electrical Contractors Assn. A Chicago NECA member conducted the pull-in tests in the way in which the work would be performed in the field.

The pull-in tests showed that the limitations set by the NECode, of not more than four right-angle bends for any 100-ft length of conduit, does not represent a condition that will damage either insulation or copper conductor when pulls are conducted at 40% fill. In making these tests, the wire was pulled in and then withdrawn and given dielectric tests, to show any faults in the wire. The pull-in tests showed that the code's 40% fill offered no problem in 100-ft runs with four bends, using rubber or thermoplastic types of wire. However, a 50% fill increased pulling difficulties and a fill of over 50% increased these to make a 60 and 70% fill almost impractical for field use.

Temperature tests showed a higher current capacity in conduit embedded in concrete than in air. In gypsum block, the lowest was registered. They reached their maximum rated temperature with approximately 10% less current than the corresponding wires in conduit and air. Electric metallic tubing, flexible conduit approximated the same limitations as with rigid conduit. Wireway showed a current carrying capacity somewhat higher than rigid conduit in air; so did underfloor raceway and likewise cellular metal floor. However, the latter could not carry as high a capacity as rectangular underfloor raceway in concrete.

The report ends by saying that it does not specify for the design engineer and others a specific set of current reduction factors for use with more than nine conductors in a steel raceway. It declares that the factual data indicate additions to the National Electrical Code are appropriate. One is that recognition be given to load diversity, also that a 40% raceway fill be used for all raceways including wireways and auxiliary gutters.

The report also includes tables showing the derating factors as suggested by L. W. Going of Portland in April 1953, as well as the derating factors suggested by S. J. Rosch, upon which the present code tables were based some years back. The paper includes a large number of graphs, tables, and illustrations of equipment used in making the tests.

Copies of the transaction paper, No. 56-952, may be obtained from AIEE, 33 W. 39th St., New York 18, at 40c to members or 80c to nonmembers.

ELECTRICAL WEST Contractors' News Letter

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

Crystal ball

Sifting through the maze of predictions at this time of year is somewhat of a dizzy process. Now that the elections are over, the predictors are somewhat less glorious with their facts and figures and a bit more down to earth. In the construction industry there have been warning signs in the decline in new home starts and in some commercial business. Of schools there will be many, but none of them were very profitable business the past year. Government expenditures for new construction may go along at about the same pace. Industrial expansion continues in the West and probably will not slacken very much.

Nutshell

In the fewest possible words, next year will be a little tougher in construction and in competition. It may be a separation of the men from the boys. While the total number of new homes predicted for 1957 remains at about a million, there are more people scrambling for the business and wage rates are in for more increases. This can also have a dampening effect, particularly on low-cost housing.

Inflation pressure

Wage negotiations are already under way in much of the West, looking toward substantial increases to match the plumbers, come July 1 or whenever the next anniversary date is. With the contractors the new wage demands also contemplate considerable more paper work to take care of the extra fringes that are being asked for. If the unions are not careful they will make it impossible for union contractors to exist unless they are big ones. The small contracting business may well go nonunion and to one- and two-man shops. After all, the customers of the smaller contracting operations are the general public and not the federal government or big industry. And the general public will either "do it themselves" or get some small single operator to do it at prices it can afford to pay.

Reminder

January 1 is the date for increasing Social Security payments by both employers and employees. This should be watched since the percentage goes to 2¼c on the dollar.

They certify

The third certified lighting class in Los Angeles completed its course on Nov. 19. About 45 were enrolled in this class and applications are coming in from all parts of Los Angeles for enrollment in future courses that are to be run. According to Roy Kreyser, the coordinator, results are being shown in the field by the number of new installations being certified recently.

Begin action

Training program in Spokane, where the Inland Empire Certified Lighting Bureau started last month, began with classes Oct. 25 at Gonzaga University. T. W. Beadle, illuminating engineer, Washington Water Power Co., was designated certification authority by the sponsoring committee. On the Inland Empire Electrical League committee are L. M. Stewart of Maxwells Inc., chairman; B. E. Plowman, Washington Water Power Co.; R. L. Wilkinson, NECA; David Moses, G-E Supply Co.; and Walter Haspedis, Columbia Electric & Mfg. Co.

Costs go up again

Price increases are continuing to come from the manufacturers despite the drop in copper on the world market. Fractional horsepower motors took a jump also.

Poor dollar!

If it's any consolation, building costs have risen twice as high in the states east of the Mississippi as in the 22 states west, according to a recent F. W. Dodge Corp. analysis. They have increased an average of 2% for the past 12 months whereas those in the east have risen 4%. However, in the district comprising New Mexico, Idaho, Montana, Colorado, Nevada, California, Oregon, Utah and Washington the annual increase has been 4% also. Costs for the 22 Western states since 1941 have risen 137%, giving the building dollar a current purchasing power of 42c. The east building dollar has been only 41c.

Improvements needed in enclosed switches were aired at a recent meeting of the Underwriters' Laboratories advisory committee to which E. E. Carleton, California Division of Industrial Safety, brought viewpoints from field experience in California. Among topics discussed were the performance of paper labels under field conditions, the dual rating of switches and the lack of space for making connections. Complaints from contractors and inspectors as to lack of space for making connections of large conductors to lugs may finally bring about revisions needed. The horsepower-rated switch itself is under fire. **More room**

Housepower advertising results in PG and E territory in September had brought 28,000 returns or 12% of the national total received up to that point. Interesting also was that 80% of the PG and E company returns were from bill-insert entries. The entries are being screened to develop good sales leads that will be turned over to contractors and dealers. **Public response**

One-night stands were used by the vaudeville companies in old days to cover the hinterland. A similar method was used to bring the Certified Lighting classes to 13 smaller cities in northern California by the Northern California Electrical Bureau. The series ended Nov. 30 with the completion of the second session in Eureka. The first session group ended Nov. 16. A more complete report on the fine attendance and interest will be published in our next issue. **Certified tour**

Sorry we erred, but our information regarding San Diego Gas & Electric Co. supplying 480-v service for 480-277-v was not true. What it is supplying is a combination single- and three-phase, 120/208 service, according to Ralph Phillips, vice-president. **Misinformed**

A right-to-work law has been passed by the city council at Palm Springs. As the only right-to-work area in the state, the construction industry faces some problems. Most skilled electrical workers must come from other areas and the question is whether the building trades will picket the city. The ordinance was passed following long picketing of many of the hotels and resorts by the hotel and culinary unions. **Reaction**

A bill to reduce the withholding of payments to subcontractors to 5% may be presented to the California Legislature when it meets in January. **Proposed**

Motor shop operators in the Pacific Northwest held their third annual conference with National Industrial Service Assn. Oct. 5 in Seattle. Members from the Oregon, Puget Sound and British Columbia chapters totaling 83 heard George Picatto of Yakima describe how the rental of motors is an important part of serving the small industries and farms of a rural community and how it can be made profitable. W. J. Haeslip of Westinghouse's Seattle repair department discussed the future outlook made bright by the greatly increased use of electrical and electronic equipment in industry. **Potential business**

A new type of floodlight using color corrected mercury vapor lamps has been employed to floodlight the venerable old Transamerica Building in San Francisco to 8 fc with only 6,800 watts. It is called the Wilson Wide-Light and Al Parker is its Northern California representative. **More output**

Professor Gordon Shuck of the electrical engineering department of the University of Washington died of a heart attack early in November. In addition to his many achievements he had recently been conducting studies of daylight illumination in schools in the Puget Sound area where there is much overcast, especially in the school periods. The work is being done to contribute to the knowledge of the subject for the Illuminating Engineering Society. **Leader lost**

A "whopping 57c an hour wage boost to make them the highest paid building trade workers in Canada, with a basic rate of $2.99 an hour" was reported from British Columbia for the IBEW, local 213. The settlement came after the contractors' offer of 28c, spread over two years, had been rejected and the union threatened to strike. Immediately the carpenters demanded a 71c an hour increase to bring them up to the electricians because their scale was already 10c less. **Get rich quick**

Advocate

Henry Rice, well known in southern California for his interest in codes and wiring and at one time a member of the Electrical Committee of NFPA representing the utilities, died of heart attack Oct. 21. He had retired from Southern California Edison Co. in 1954.

Moves

Standard Electric Supply Co. of Oakland, after seven years in a warehouse location on Grand Ave., has moved to much better facilities at 119 10th St., Bud Edwards, its owner, announces. The better facilities include 7,500 sq ft of customer parking.

Another

Electric Supplies Distributing Co.'s Santa Ana branch moved to much larger quarters at 1515 Poinsettia St. on Nov. 16. Burt Murray, its manager, staged a manufacturers' display of the lines carried as a feature of the open house for customers and friends.

Heard this?

News about people—Nat Blumberg has been named vice-president in charge of West Coast operations for Lightolier Inc. with headquarters in the new West Coast showroom and office in Los Angeles at 527 W. Seventh St. Blumberg has been in California since 1947 and during the past three years has supervised sales for the Western states . . . Dick Vaill, Western regional manager for Edwards Co., announces that Los Angeles has been made a dispersing center for the 10 Western states and Hawaii for the Edwards line . . . Charles R. Holland, electrical inspector at Sacramento, retired Nov. 5 and will become apprentice coordinator for the joint program of NECA and IBEW in Sacramento. A new manager for the Redwood Empire Chapter of NECA is Bob Coburn . . . Paul R. Babcock, a consulting mechanical engineer, has joined T. O. Gerlishe, electrical engineer, at 132 Ninth St., Oakland.

Promotion

Ben J. Hooey has been appointed regional sales manager for Fluorescent Fixtures of California in San Francisco. He was formerly Northwest district manager for Washington, Idaho and Montana and had headquarters in the Seattle branch.

Diversify crop

"The electrical contractor must turn to other wiring fields to maintain or surpass his past business volume," the electrical contractor news section of the B. C. Electric Co.'s monthly bulletin advises after noting that there were a thousand fewer starts of new residence construction for the first nine months of 1956 than for 1955. Of the 3,177, 1,882 were given Red Seal certification for adequate wiring and 73 the Gold Seal for a 200-amp job.

School sense

"Common sense in school lighting" is a sensible little booklet of 24 pages recently issued by the American Association of School Administrators, 1201 16th St. N.W., Washington 6, D.C., at 50c a copy. It gives a set of realistic goals that can be met with currently available materials and without elaborate and costly school designs. It gives due recognition to daylight, electric light, surface brightness, color, space relationship and other design factors. Also it talks about reconditioning existing classrooms and controlling costs.

New codes

New 1956 edition of the National Electrical Code is now available from the National Fire Protection Assn. The paper-bound copies with 480 pages are at $1 a copy. A complete code with 69 other NFPA electrical standards in other fire codes is available as Vol. 5 in the National Fire Code. These sell at $6 per volume in bound book form.

Dual job

A combined home fire alarm system that will also control the automatic heating, cooling or attic fans and cut off the heating system or fans in case of fire is now available from the Edwards Co.

Watch dogs

San Jose, Calif., electricians have been given a job report card by Local 332, IBEW, on which to report installations of appliances, sound systems, lighting systems, fire and burglar alarm systems, etc., by other than their own craft. The report is to be kept for reference in case of jurisdictional disputes with other crafts.

EMEA tours

Electrical Maintenance Engineers Assn. of the Columbia Basin had a conducted trip through the Oregon steel mills for its Oct. 25 meeting . . . The EMEA of Southern California had a field trip Nov. 15 to the Electro Data Corp. plant. The previous meeting had Arthur F. Atkinson Jr. of the Air Pollution Control District speak on "Industry's Responsibility for Smog Control."

Inspector doings

Among inspectors' associations—Annual convention of the Electrical Inspectors Assn. of British Columbia will be held Feb. 14 and 15 in Vancouver. Location had not been decided. For its October meeting, the group made an inspection tour of the 138-kv substation of B.C. Electric . . . Utah Chapter discussed grounding and other problems with respect to school wiring at its Nov. 13 meeting. Jim Thompson, Graybar Electric, presided . . . Arizona Chapter met at Mesa, Ariz., Nov. 10 for a lively code discussion . . . Central California Chapter met in Southern California Edison Co.'s offices, Visalia, Nov. 17 to see the film "Album of Public Safety" and for code discussion.

Will take heat

U. S. Rubber Co., wire and cable department, has announced a new heat- and moisture-resistant type RHW wire, with what it calls "U. S. Super-Eonite Compound." It is suitable for continuous operation at conductor temperatures up to 75 C in both wet and dry locations, and operating voltages up to 600 v.

Slot meter

A new coin meter has been announced by M. H. Rhodes, maker of Mark-Time products, for use by trailer camps, motels, tourist courts, apartment houses, laundromats, tennis courts, etc. It is a heavy-duty device rated at 28 amp, 120/240 v a-c. A double-pole unit is available for clothes dryers, eliminating the need of a relay. It is slotted for quarters and dimes.

Teaches how

A sales training course for electrical contractors on Housepower will soon be offered by Edison Electric Institute in cooperation with the National Electric Contractors Assn. It is designed so that the utility company, contractors association, electric league or wiring bureau can present it. It is designed either for six 2-hour meetings or three 3-hour meetings. It is also appropriate for training anyone making wiring recommendations and proposals. Price of the course will be $250 fob New York and may be ordered from Housepower Program Manager, Edison Electric Institute, 420 Lexington Ave., New York 17.

Needed change

Largest meeting on record of the Los Angeles Chapter, NECA (125 contractors representing 84 companies in four counties), authorized changes in the constitution and bylaws, Nov. 19. Most important was the removal of the 52-member requirement for a quorum and to give the board of directors more responsibility for the affairs of the association. Difficulty in the past has been caused by widely scattered membership and several divisions and branches making a general membership meeting difficult. President Andrew Hannan and Assistant Manager Jack Rawlins were complimented for the special turnout.

New home

New home of the Los Angeles Chapter, NECA, soon to be known as Southern California Chapter, is nearing completion. Having purchased an old residence at 24th and Broadway, Los Angeles, several years ago and used it as headquarters until much more space was needed, the chapter razed the old building and is erecting a new one, of which the second story will be used for chapter offices, the ground floor rented. The chapter has the largest membership of any in the United States, covering four counties—Los Angeles, Orange, San Bernardino and Riverside Counties.

Space saver

More flexible and efficient panel board design and installation is covered in a new bulletin by Federal Pacific Electric Co., available to contractors on request. It is Bulletin No. 1-160. It provides data on plug-in breakers and space-saving arrangements . . . Federal Pacific's ad ranking contest offers contractors a free trip to Paris for the guessing of a series of ads on the company's line of circuit breakers.

They're "cool"

Sylvania, which started the return to pink lamps, has joined the parade of other colored entries with a family of "decorator" light bulbs with an aqua-tinted "cool"-light . . . Sylvania completed a series of fluorescent lighting clinics in November. First meeting was in Los Angeles where T. C. Sargent and Dr. Irwin F. Lowry conducted the clinic. Later meetings were held in Phoenix, San Diego, San Francisco and in the Seattle area.

Second anniversary

Snake River Valley Electrical Assn.'s second annual electrical conference will have transpired Dec. 1 before you receive this issue. With Contractor Fred Koch as president, the year's activities will be reviewed and the program—including adequate wiring promotion, all-electric parade of homes promotion, etc.—will be outlined. A. H. Gudie, Biddle Trade Publishing Co., Los Angeles, will be a featured luncheon speaker.

Every circuit labeled by C. J. Bradford told the 27,426 adults visiting the home that . . .

Plenty of Housepower Pays

Strategic placing of a display setting for the service panel, distribution panels and relay panels for the all-electric home in the Boise Parade of Homes really paid off for the Snake River Valley Electrical Assn., according to its secretary-manager, C. J. Bradford. In fact, it was so successful that Bradford said, "This demonstration of adequate wiring and built-in electrical equipment in the all-electric home is going to ease the load considerably for us in selling the building contractors in the future on the fact that people will pay more for a home adequately wired and with built-in electrical equipment."

The entire Parade of Homes activity in Boise this year was sponsored by the Snake River Valley Electrical Assn. It had the cooperation of 10 participating builders. But the outstanding feature was the all-electric home, which was the key to the entire group. Its builder, K. W. Hay, and the electrical contractor, Electric Service Co., combined to fill it with electric services for comfort and convenience.

Entrance to the electric home was through the garage and passed the utility door adjacent to the wiring panels. These were displayed prominently as shown in the illustration and each item was labeled to tell what it was and what it served. Most of the time a line of people were waiting to get in so that the standees near the door had ample time to study the panel and the wiring services.

The home was equipped with a Weathertron electric heating and air conditioning system, mercury switches with a push-button panel, a master panel at the front door and one in the bedroom. The utility room was equipped with a washer-dryer combination and an upright frozen food locker. The kitchen had lighting similar to the G-E kitchen. It also had built-in wall electric refrigerator, built-in ovens, range surface units built in, dishwasher and disposal, a built-in juice and mixer unit also.

In the living room was a built-in Hi-Fi and TV set observable from the patio, living room and dining room. The intercom system and the Hi-Fi fed to all rooms, as well as the utility, patio, front porch and garage. All of the rooms had planned lighting. The garage door was electrically operated inside or outside. The garage had a work bench with electrical tools.

Attendance was 27,426 adults, plus several thousand children, for the showing. In an area with a 50 to 60,000 population, this was a remarkable percentage of attendance. To the surprise of a number of the building contractors, the all-electric home sold immediately upon being put on the market after the close of the show.

With two new chapters of the association in Twin Falls and Pocatello, with about 50 charter members in each, the association is planning to have three Parade of Homes going at the same time next year under the same state-wide advertising program. Bradford believes that they will have no trouble selling the building contractors on adequate wiring and built-in electrical appliances in the majority of these homes next year. The advertising, of course, linked with Live Better . . . *Electrically* and the Housepower programs and will do so in the future as well. All participants this year were given a questionnaire to record the results, their criticisms or suggestions for improvements of the promotional activity next year. These are being studied in order to learn from this year's experience for a much better and bigger promotion in 1957.

Christmas setting outside of the dining room windows of the San Francisco home of Ed Kleinhans, Kay Electric Co., last year, shows theatrical lighting skill he first gained wiring the San Francisco Opera House years ago. Mr. and Mrs. Kleinhans, silhouetted at the door, entertained hundreds of visiting friends with a music and light spectacle

ELECTRICAL WEST

Four Years of Grace

THE dimensions of the Eisenhower victory at the poll are impressive. It should be the cause of gratification, but not relaxation, for business and industry. The favorable business climate of the past four years has been due in no small measure to the sound policies and strong personality of the President. It has proved to be a period of unprecedented prosperity and growth in practically all segments of the economy. Business leaders, as they face another four years under the leadership of President Eisenhower, face a grave responsibility in making sure that the public at large learns and understands more about the relationship between business operations and the welfare of the individual.

Electra, with her intuitive insight into cause and effect, discusses some of the implications of the country's November 6 performance at the polls on page 72. Her observations may be thought provoking—and might even dispel much of the complacency that could exist in business circles as a result of Mr. Eisenhower's magnificent and well-merited endorsement by the American people.

Plan Now

THE 1957 celebration of National Electrical Week (Feb. 10-16) is still two months away. However, those two months are beset with holidays, budgets, and all sorts of distractions that make further procrastination about local programs a dangerous thing. It takes time to design a local program that will take full advantage of the impact that the Electrical Week celebration will have nationally. It takes time to get local proclamations approved, to arrange to cover civic luncheon club programs with Electrical Week speakers, to write articles for the company's house organ, and to arrange intra-industry meetings so that everyone will get on the bandwagon and "plug" Electrical Week in local advertising programs.

National Electrical Week is a real opportunity to sell the electrical industry and its services to the public. It is the best time during the year to focus public attention on the indispensable services and innumerable conveniences that the industry provides. While the celebration at the national level undoubtedly will get much attention, the real impact and the most good will come from hard-hitting observance programs at the local level. Every member of the electrical industry should check to make sure that, in his locality, plans for celebrating National Electrical Week are under way, that they are being given the necessary attention and leadership, and that all segments of the industry are being encouraged to participate.

The year 1957 can be a great one for the electrical industry. National Electrical Week, coming early in February, could lay the foundation for greater success for all subsequent promotions throughout the year. Let's everybody get in the act to tell and sell our industry.

Pioneering Goes On

STOCK option plans in recent years have become a recognized method of attracting and compensating executives by the country's large industrial and commercial organizations. This same scheme has now been extended to the electric utility area with the inauguration, by the Montana Power Co., of a restricted stock option plan.

Montana Power, in pioneering such a program in the utility field, gives recognition to the changing economic times. The stock option program not only provides incentive awards to managerial personnel but also permits management men to build up an estate without heavy income tax penalties. Substantial stock ownership, through an option plan, also is no small incentive toward improving executive performance.

Briefly the Federal Power Commission has approved the Montana plan under which the company's board of directors may grant options to company executives whereby they can buy a block of company stock at 95%

EDITORIAL VIEWS

of the market quotation on the day the grant was approved. The employee cannot exercise the option for a period of two years from the date of the grant or ten years after that date. Thus far over 75% of the eligible executives have been granted such options by the Montana Power board. It is obvious that company growth over a 10-year period might well make the options extremely valuable and would represent a tangible expression of reward for participation in the company's progress. The stock option plan is in addition to the company's employees' stock purchase program under which any employee may purchase common stock of the company through pay roll deductions. It is of interest to note that over 50% of the company's regular employees are participating in the purchase plan.

At all levels and in all companies employee participation in company ownership could go a long way toward curing many of the popular misconceptions about business profits, and employee relationships.

It is particularly gratifying to see the adoption, in the utility industry, of a program that places utility management personnel on a par with their contemporaries in other industries insofar as recognition and the opportunities for remuneration are concerned. Broad adoption of such a policy might make young engineers take a new look at a 60-cycle career.

Certified Lighting Brightens

ANOTHER convert to a Certified Lighting program is Spokane where the industry started classes in October. Meanwhile in PG and E smaller centers, two traveling faculties have been bringing the program to contractors in the country. And what is better, results are beginning to pile up for contractors who previously took the short practical courses and are using their knowledge to sell better jobs. Any who are not doing so are missing out on the best thing ever offered to lift lighting out of the cut-down competitive no-profit levels into which the business had sunk.

Think Big!

WE have been thinking in terms of statistical market saturation based on a one-per-home proposition. The automobile industry, the telephone industry and our own TV industry have shown us the fallacy in this kind of thinking. Statistical saturation is a fallacy. What is needed are new concepts of community or trading area potential based on multiple applications for a product, rather than statistical saturation.

We have been thinking in terms of products when revolutionary new ways of living better electrically are only as far away as that rapidly closing time span which separates new knowledge in the research laboratory from new products in the customer's home.

We have been thinking in terms of adding to residential load, when we should have been thinking in terms of MULTIPLYING it. One of the goals of the electrical industry today is 100-amp wiring for America's homes. But in California, Ronald Reagan, MC on the General Electric Theater Sunday evenings, is building a house wired for 600 amp! Considering the influence of "California style" on our way of living in the last few years, this may be more than a straw in the prevailing winds from the West.

We have been thinking, historically, in terms of a 2% annual increase in productivity. We've got to start thinking in terms of 3%. If that one per cent seems insignificant, it becomes tremendous applied annually across the board of our whole American economy . . . It all adds up to the biggest marketing job that we, or any industry, have ever undertaken.—Roy W. Johnson, executive vice-president, General Electric Co., New York City, before the 21st annual conference of the International Association of Electrical Leagues, Detroit, October 1956.

Outdoor lighting and all-electric kitchens were featured in Hawaii's first Parade of Homes, which was designed to show . . .

How to Live Better . . . Electrically

Leslie A. Hicks, president, Hawaiian Electric Co. Ltd.

A broad picture of facilities available in the Islands for better living generally and better living electrically was given prospective home buyers at Honolulu's first annual Parade of Homes. Sponsored by the Home Builders Assn. of Hawaii and the Honolulu *Advertiser* during National Home Week, this five-home all-electric Parade was viewed by almost 40,000 people in an eight-day showing.

Tying in with both LBE and OHI, the Parade took as its theme, "Designed to Help You Live Better . . . *Electrically*." An eye-catching insignia incorporating this theme appeared on the cover and inside of the *Advertiser's* special section heralding the Parade and in ads appearing throughout the public showing.

Although the Island Parade was small as compared with some on the mainland, we were gratified that participants elected to make it all electric. Every home was wired to meet modern electrical requirements now and in the foreseeable future. Lighting took into account Island outdoor living and particular attention was given to exterior illumination for dramatic effects, convenience and safety.

Each all-electric kitchen was supplied by a different manufacturer, with Crosley, Frigidaire, General Electric, Hotpoint and Westinghouse participating. There were such recent developments (some of them firsts for the Islands) as "no-stoop" refrigerators, with swing-out or roll-out shelves; combination and wall-hung refrigerator-freezer units; double-duty ovens and counter-surface cooking units among the built-ins; the appliance center that eliminates a tangle of cords. Kitchens were colorful with appliances in the new shades and in copper.

Hawaii's five model homes, including land, represented total investment of more than $150,000 and required the skills of more than 200 construction workers. The Parade was truly a cooperative effort since the planning included representatives of financial institutions, appliance and paint manufacturers, distributors and dealers, building materials suppliers, newspaper, utility and Chamber of Commerce.

The homes were built on individual sites in different parts of the Island and each was completely modern and adapted to its setting. The homes were planned and supplied by five local material houses and were let on bids for construction. Every house was completely furnished.

Since the Parade was designed to promote improvement of existing homes as well as to show the latest in new construction, news stories about electrical features stressed the wiring, the kitchen conveniences, the modern lighting. Householders were told how to judge the efficiency of their wiring; were urged to return during nighttime viewing hours to see the outdoor light-

Leslie A. Hicks, right, Heco president, talks over plans with Lorrin P. Thurston, president, Advertiser Publishing Co., a sponsor

Potential buyers—more than 40,000—toured the homes. Few completed the parade circuit in one day; many returned for a second look

ing; were assured that they would see "dream kitchens," the best that modern engineering and electrical ingenuity can provide.

Because an educational promotion of this kind is a genuine service to the whole community, Hawaiian Electric Co. was interested in it from the start, took part in some six months of planning. The homes were manned during the entire inspection period by company home service staff and other personnel. Copies of the Step by Step booklets were given to every visitor.

As in the earlier LBE campaign of the Honolulu *Star Bulletin*, the company gave monetary aid on all advertising carrying the Live Better . . . *Electrically* slogan. Assistance on both campaigns was given all through the preparation periods by members of the Heco organization, who helped in every way possible to make for smooth and successful operation.

All who participated are more than gratified with results. Despite heavy rain on the first week end, crowds were constant and viewing hours were increased in response to repeated requests. Many visitors returned for another look, often with a tape measure to "try some appliance for size" in their own homes.

This promotion, with the earlier LBE campaign and continued reference in cooking class announcements, quarterly PCEA promotions, subdivision cooperative assistance advertising, has made Islanders well aware of the advantages of *living better electrically.*

PARADE OF HOMES
DESIGNED TO HELP YOU LIVE BETTER ELECTRICALLY
SEPT. 15-23
Lewers & Cooke's SUBURBANITE
City Mill's HALE POLYNESIAN
American Factors HALE OHANA
Hawaii Builders HALE KOU
Island Lumber's BAY VISTA
Strike up the band! Here comes the
PARADE OF HOMES
HOME BUILDERS ASSOCIATION
Build with Confidence
HOME BUILDERS ASSOCIATION OF HAWAII

All advertising carried the theme, "Designed To Help You Live Better . . . Electrically"

Erma Meeks Boyen, director of home service for Heco, and her staff were on hand to answer questions about electric appliances

At an industry meeting in Los Angeles, R. H. Cockfield, Department of Water & Power, tells of the need for a unified sales drive

Industry benefits in southern California as

Joint Venture Unifies Promotion

Appliance sales in southern California are being given a big boost in intensive promotional campaigns announced by Southern California Edison and the Los Angeles Department of Water & Power.

For the first time in over a decade the Los Angeles city-owned Department of Water & Power is conducting a full-scale electric range campaign. Preliminary to the announcement of the campaign, executives of the electrical appliance industry, officials of the Southern California Edison Co., and the cities of Glendale, Pasadena and Burbank were invited to review its features.

At a similar meeting held earlier in September the Edison company announced its range sales program which will follow the same schedule and in many respects will parallel the department's activities.

Representatives of the electrical industry expressed themselves as highly pleased with the united effort displayed by the two major electric utilities which serve the Los Angeles trading area. The effect of this gigantic, planned campaign will be of benefit to the entire group.

Go Modern, Say Department Ads

The department advertising campaign, which has as its theme "Go Modern; Cook Electrically," includes display advertising in metropolitan and community newspapers, new, clever, animated, spot TV messages, full color billboards and car cards, and colorful new range folders. The Live Better . . . *Electrically* slogan is shown in each case.

Sales promotional activities, which were developed for the dealers in their serving area, include five 2-day theater-size electric cooking shows in various areas of the city. The shows conducted by department home economists will combine education, entertainment, selling and prizes, which are expected to result in a volume of range prospects for the dealers. Three new home economists have recently been added to complete the staff and make possible a complete homemaker program.

Demonstration in dealers' stores will be conducted by department home economists for audiences invited by the dealer or, if desired, the audiences will be obtained by the department's program coordinator.

Something special has been provided for customers in the San Fernando Valley. A new Electric Living Center for the Valley area, equipped with the finest contemporary displays, will feature the multiple model kitchens on display. A demonstration auditorium, with a capacity for an audience of 150, will be equipped with an on-stage demonstration kitchen as well as an off-stage preparation kitchen. Continuing range demonstration programs for women's clubs with tie-in by distributors and neighborhood dealers are being planned. The full array of advisory planning services will be available to department customers in the new San Fernando district office. One new home economist will make this her headquarters.

The "new look" display props will

Floyd Lovelace, residential sales manager, presents the department's 1956-57 program. Host "Gerry" Allen is seated at left

Jack Meserve, Edison residential sales manager, guest speaker, explains how his company is campaigning in its service areas

also be used to glamorize merchandise in other department offices and to help guide prospects to dealers' stores. New point-of-sale display material will be available to all dealers who will use it to full advantage. A new "cost of operation" calculator will be supplied to their salesmen to show their prospects how little it costs to cook electrically.

Arrangements were made with electrical contractors in each neighborhood, who have agreed to give special attention to electric range installations and to do their work for a fair price.

Department dealer relations representatives are working actively with appliance dealers to give full effect to dealer participation and benefit from the sales campaign.

A kick-off dinner meeting to announce this program to the dealers was held at the Los Angeles Breakfast Club on Sept. 12, with G. S. "Gerry" Allen, sales promotion manager, as host and mc.

The All-Electric Party

The meeting was on the political convention theme with a campaign for "delegates" to support the "All-electric" party. R. H. "Bob" Cockfield, business agent, was the keynote speaker who pointed out the need for a unified campaign by everyone in the industry.

He was followed by Floyd Lovelace, residential sales manager, who presented the dapartment's "platform" for 1957, which was the sales promotion program described above. Samples of the advertising material were shown by Elwood Robinson of the Elwood J. Robinson & Co. agency.

A special feature was a guest speaker from Southern California Edison Co., Jack Meserve, residential sales manager, who described the Edison sales program for 1956 and 1957.

Edison Offers Hawaii Trip

Free trips to Hawaii and outings in the High Sierra are offered dealers and their wives as prizes in the electric range sales contest that Southern California Edison Co. is sponsoring.

Two dealers will win trips for two to the Islands and Edison district representatives and their wives will accompany them as hosts. In addition one dealer in each of Edison's 30 districts will win a High Sierra holiday at the company's Big Creek lodge.

The contest, which ended Nov. 30, is part of an intensive 15-month advertising and promotional progam being conducted by the company (EWEST, September, p 140). Tied in with the Live Better . . . *Electrically* slogan, the campaign includes a broad program of assistance to dealers.

Edison staff members visited every appliance dealer in the company service area to offer window display material, banners and other in-store display pieces promoting electric ranges. The company also sponsored electric cooking demonstrations at regular intervals at its Electric Living Centers. Dealers also were invited to request special demonstrations in their own stores for prospective customers.

Will Spend $400,000

A stepped-up advertising schedule, amounting to about $400,000 above the company's institutional advertising budget, will help pave the way for dealer sales. A combination of newspaper and magazine ads, billboards and the Edison radio program, *The Bob Parker Show*, will total an estimated 70,000,000 consumer contacts per month—all stressing the idea that electric cooking is fastest, cleanest, coolest and that it is automatic.

Employee Program

Edison employees are being encouraged to buy electric ranges through a program that offers them liberal financing terms with no interest. In addition they are given an opportunity to win prizes for submitting the names of range prospects, which are turned over to dealers for follow-up.

Following the October and November range campaign, emphasis will be shifted to dryers in December, January and February and in March back to ranges and all-electric kitchens in a continuing campaign that will last through November 1957.

SELLING THE SLEEPER—Blankets, called the real sleeper in the electric housewares field, are being aggressively promoted in the northern California area in a fall and winter promotion sponsored by Northern California Electrical Bureau. After the first few weeks, many dealers reported that they had sold out their full quota from the factory. Pictured here at San Francisco rally inaugurating the drive are from left: Jack Ross, PG and E manager of domestic sales; Bert Reynolds, NCEB manager; LeRoy Herbert, John Oster Co.; Carl Leppel, Landers, Frary & Clark; Bill Cooney, Westinghouse

WESTERN WINNER—A winner in EEI's national Housepower contest was Mrs. Helen Todd of Reno. She is shown below receiving her prize—a certificate for a 12-cu-ft Hotpoint freezer—from Frank Tracy, president of Sierra Pacific Power Co. Looking on are A. A. Nerling (left), Sacramento appliance sales manager for Graybar, the distributor, and Richard Lusetti, manager of Lusetti's Home Appliances, Hotpoint dealer at Reno

THAT SHEER LOOK—Frigidaire believes that dynamic obsolescence is a key to increased sales. Its 1957 line, shown throughout the West last month, features the new square corners that are adaptable either to free-standing or built-in installation. A big promotion program will stress the Sheer Look; will appeal to Mrs. America's desire to be up to date. This year's stage show was as peppy as ever; showed the appliances live and in motion pictures. Catchy tunes and amusing dialogue were combined to give a complete sales pitch. Dick Smith, troupe leader, closes the Oakland showing (below) with the appliance center that the company had made available for dealer sales floors. Everything is included for the sales job

D. W. Gunther, Mgr. Materials Engineering, points out some of the controls that make sure the quality designed into Westinghouse products is delivered to you.

How Westinghouse takes trouble out of your workaday world

Trouble-free equipment is no accident. At Westinghouse, the quality that keeps your equipment out of trouble starts on the designer's board, is assured . . . often enhanced . . . by material selection, and it is safeguarded by precise control of production.

Take one. Any Westinghouse product. You can't miss. From production order to shipping platform, this is *your apparatus* . . . its quality, *our responsibility.*

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING FOR **YOU!***

We're proud of the men who stake their reputations on these motors.

147 OK's, 26 double-check signatures say "it's right"!

That makes the Westinghouse powerhouse motor — available in ratings to 5,000 hp — the nearest approach to "won't fail, won't let you down" in the industry.

Indoors or outdoors, it is designed to do its job — withstanding dirt, heat, moisture, or loads beyond normal service requirements. Its materials are specially selected, many specifically developed, to meet unusually severe performance standards.

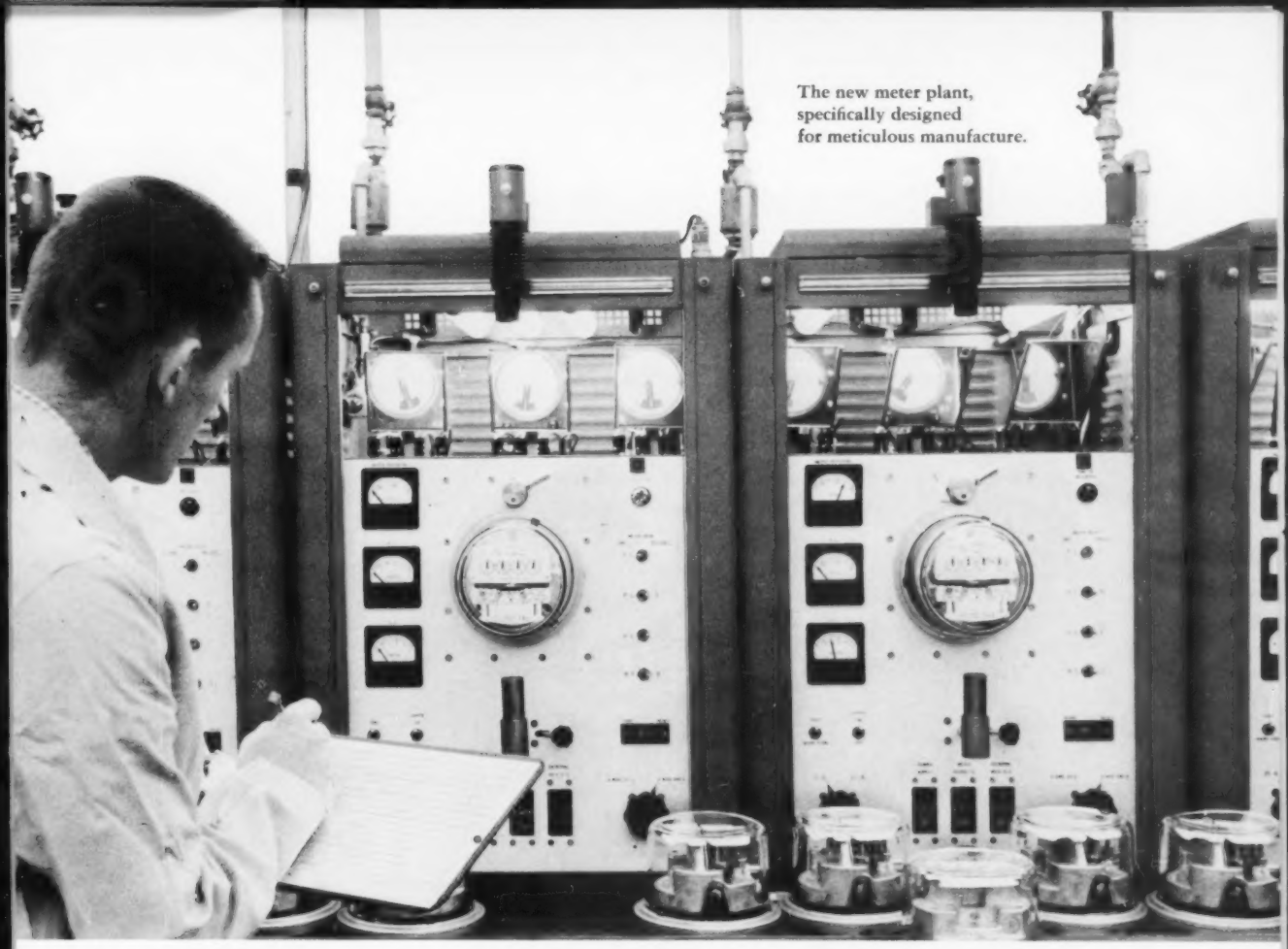
But our real point of pride is the conscientious check-on-check manufacturing procedure that culminates in 26 special in-process inspections, signed by responsible department supervisors. Your motor is right, step by step. Twenty-six personal reputations and careers are bet on it.

Supervisor of inspection signs the release — here an 800-horsepower, 10-pole induction motor is checked over to make sure Micarta® slot wedges and stator windings are perfect. Following this inspection, windings are tested for grounding.

High-frequency test — inspector tests for turn-to-turn faults as the rotor arm slowly revolves, inducing voltage into the windings. This check reveals any short-circuited windings, assures that coils are correctly connected.

Vibration test — balancing equipment checks rotor shaft, frame and bearing brackets for vibration, determines amount and location of imbalance.

WATCH WESTINGHOUSE



The new meter plant, specifically designed for meticulous manufacture.

A million out of a million are right!

100% inspection is key to uniform meter quality

You get uniformly accurate and dependable meters from Westinghouse for the simple reason that substandard units are not finished or shipped. The "go, no-go" test above, at line's end is no mere sampling. It checks *every* meter. The automatic full-load, light-load and power-factor test must be passed or the meter will not be shipped. Quality production with testing like this is one of the reasons why the Westinghouse meter is the only meter *guaranteed for life.*

Vibration and drop tests are conducted regularly to discover any possible source of damage in shipment. Specially designed packaging for Westinghouse meters has been awarded the seal of the National Safe Transit Committee.

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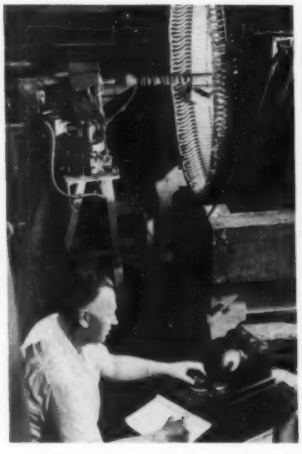

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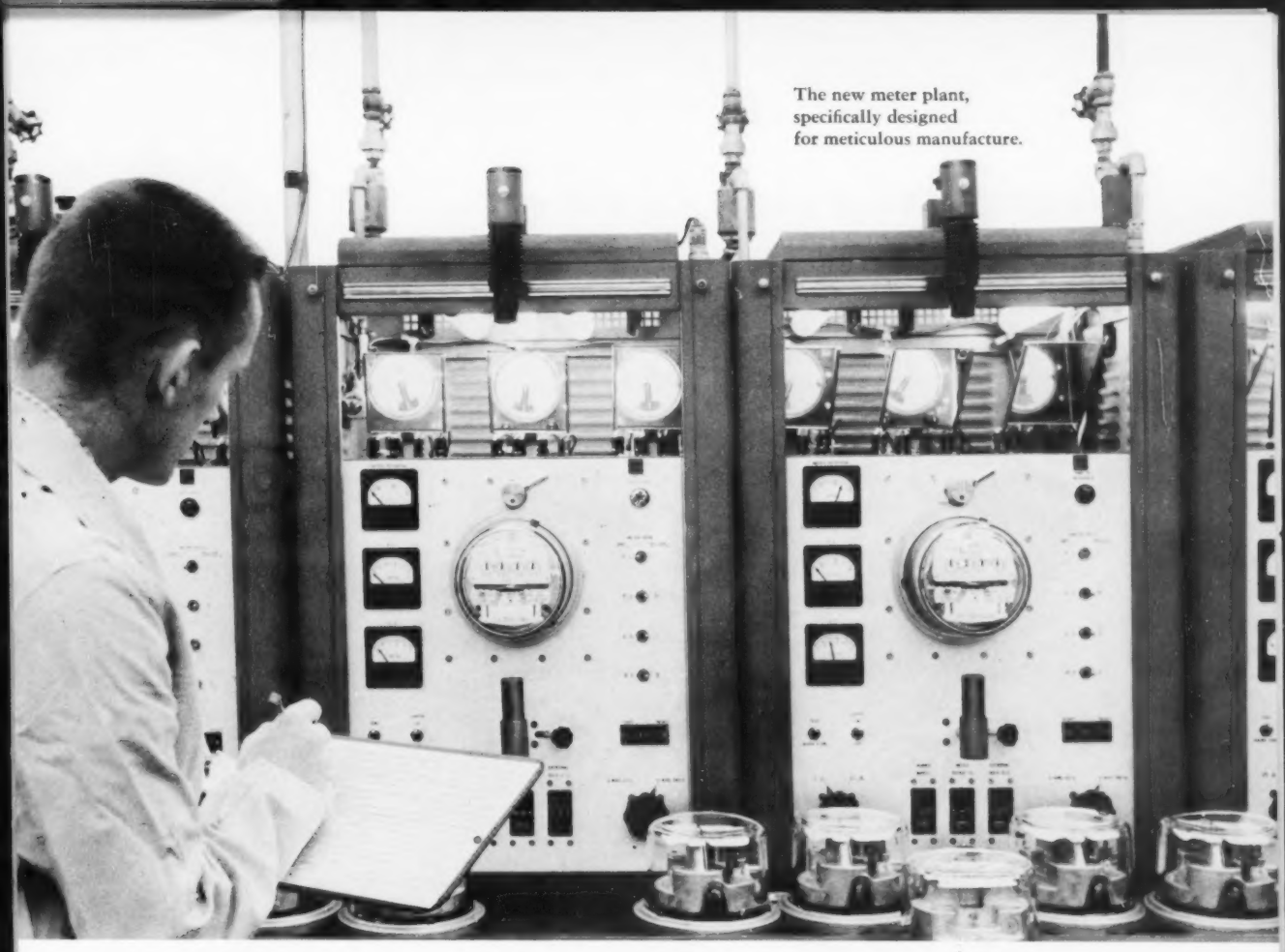

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*WHERE **BIG** THINGS ARE HAPPENING FOR **YOU!***

Building quality is a way of life with men in transformer and voltage-regulator production.

Quality is a certainty . . . Every regulator is given a complete operation and insulation check prior to shipment. Here the CJ-1 relay settings get a final monitoring.

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING FOR **YOU**!*

Proved on the production line . . .

Quality that's designed in, stays in

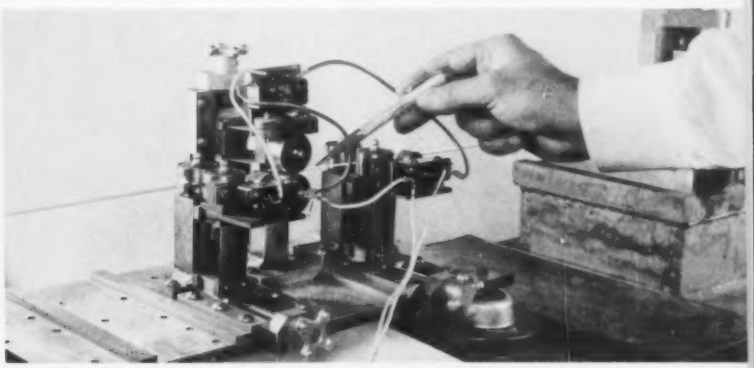
The heart of a program that has actually pitted department against department in plant-wide contests to assure manufacturing quality is this slogan: "Quality must be ***built*** into a product; it cannot be ***inspected*** into it!"

In addition, all Westinghouse foremen spend one week end each year attending a QUALITY SEMINAR where they exchange new ideas and experiences.

Quality control is more than a procedure at Westinghouse. It's an attitude, inspired by team spirit, proved by on-the-line tests. It's your best assurance that Westinghouse equipment will give you the trouble-free performance you want.

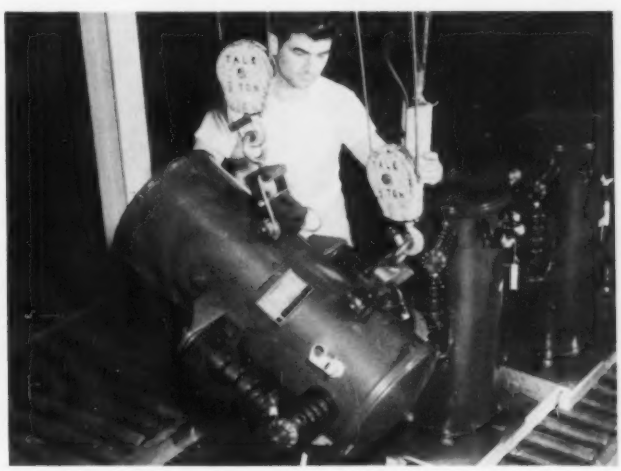
Basic "take it" ability of Westinghouse apparatus, mechanically and electrically, is thoroughly proved on the production line — far beyond service requirements.

Quality is wound in . . . High-frequency test checks turn-to-turn and layer-to-layer insulation both *before* and *after* assembly of transformers and regulators. Preassembly testing is vital, since insulating value of oil might temporarily hide flaws detectable only at this point.



Quality is 3,000 miles long . . . Minute burrs and imperfections on copper wire and strapping can damage insulation. That's why Westinghouse perfected a new system of detection that eliminates any flaw greater than 2 mils. With insulation at a minimum of 20 mils, the protection factor is better than 10 to 1.

Quality is three skins deep . . . Westinghouse "Coastal Finish," an exclusive three-layer protective skin for transformers, and regulators, forms a granite-hard, weather-resistant surface. Every transformer gets a minimum paint thickness test and a paint adhesion test.



Quality even upside down . . . Tilt test for transformers is the last check on the shipping room floor against oil and air leaks. Pressure tests are also applied before painting, and again after painting when the unit is filled with oil. Every transformer produced receives preproved performance checks like these.

While many production tests are complex, these are direct, simple, effective.

Trial by vacuum — entire interrupter chamber is evacuated to less than one micron with the vacuum manifold above as a final check on soundness of joints and seals; next operation, filling the unit with sulphur hexafluoride.

Trial by water — here the completely assembled interrupter chamber takes the bubble test. In this check, the chamber is filled with dry nitrogen to 30 pounds pressure; leakage, if it exists, is instantly detected.

Here a bubble is a sign of trouble

Westinghouse gas-type interrupters like the VLB switch can't tolerate leaks, or they're short-lived on your lines. Bubbles in water-immersion tests point straight to any potential source of trouble.

All valves and gauges are subjected to 30 pounds pressure with dry nitrogen and "dunked" to prove themselves before they get onto the production line. The operating shaft seal is given the same test and then, after complete assembly, the entire unit is again checked for bubbles.

To assure complete tightness of all joints and seals, the entire interrupter chamber meets a much tougher test. It is evacuated to less than one micron and held there for 20 minutes to check against any pressure rise.

Only then may it be filled with the sulphur hexafluoride which will effectively quench arcs through its long, dependable service life.

Precision manufacturing techniques, proved by simple tests like this, make the VLB interrupter safe for your system.

WATCH WESTINGHOUSE

Increased breaker ratings add importance to testing of components.

Quality to its finger tips

Power breaker contact tips take 12,000-lb. stress

The brazed joint between silver contact tip and Cupaloy body of every single breaker contact is stressed to 12,000 lbs. This test is made on all curved joints, from both directions.

Transmission of larger and larger blocks of power has sent breaker ratings skyrocketing . . . and the greater the capacity of the breaker, the more important it becomes that every component be checked for utmost dependability. That's why Westinghouse tests breakers, right down to their contact tips.

The business end of the interrupter contact in a Westinghouse De-ion® grid is a silver-tungsten tip brazed to a Cupaloy* body. Before assembly, every piece is 4 times tested for quality and strength of braze. The ability of the breaker to stand up to the mechanical stresses of high power faults and high-speed reclosing is preproved with the severe quality tests shown here. For instance, the Rockwell hardness test: After brazing and heat-treating, every single Cupaloy body is checked for hardness, to make 100% sure breaker contacts will withstand the punishment of short-circuit operation.

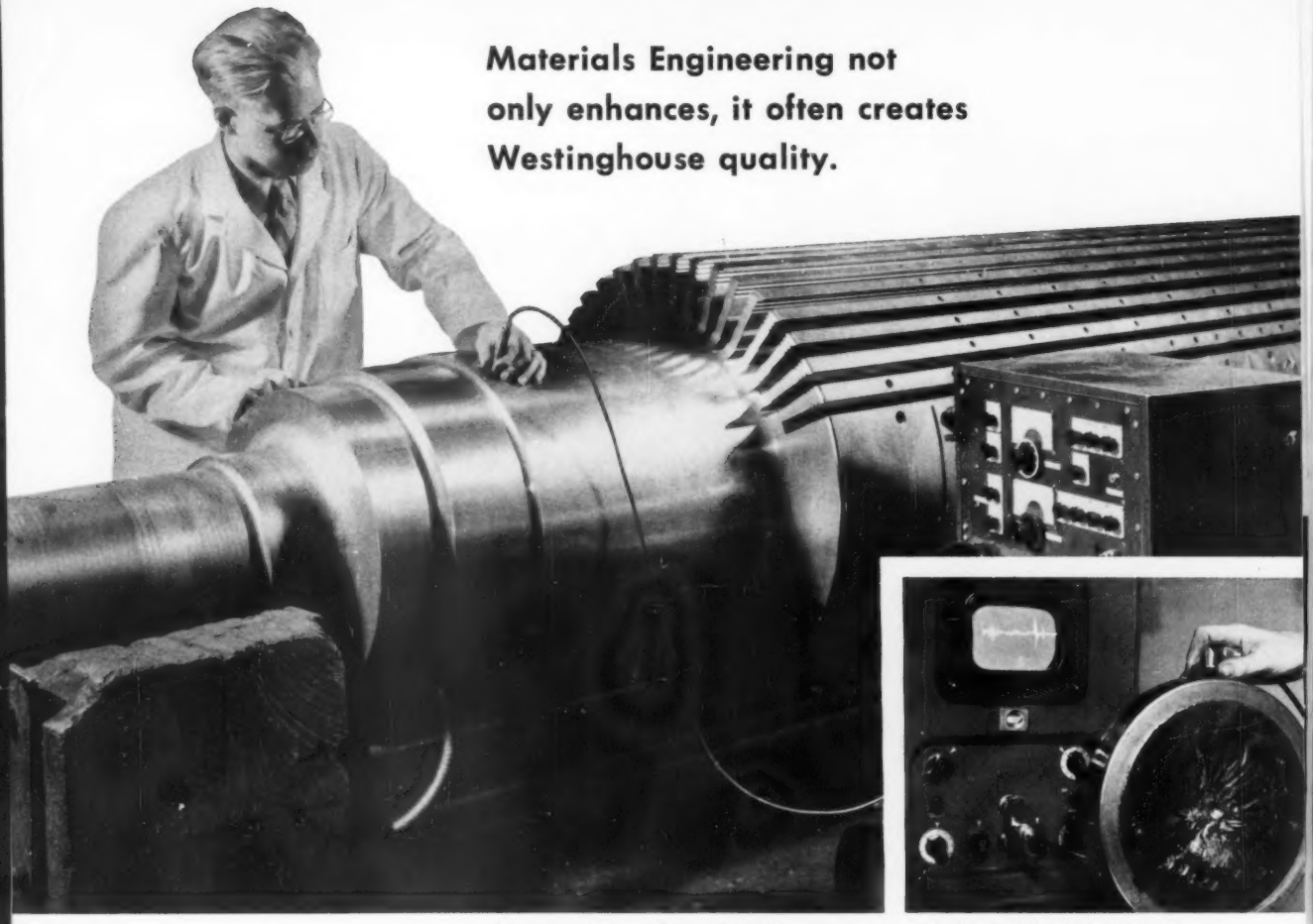
These are just a few of the tests Westinghouse breakers go through on their way down the production line. The doubts are hammered out — to give you all the performance that good design intended.

*Trade Mark

In the ultrasonic test, the electronic reflectograph proves that brazed areas are free of even microscopic faults.

*WHERE **BIG** THINGS ARE HAPPENING FOR **YOU!***

Materials Engineering not only enhances, it often creates Westinghouse quality.



Ultrasonic test — 34 feet of turbine-generator rotor is thoroughly checked in minutes by high-frequency sound. Cracks, inclusions or other flaws can be detected instantly in this production line, nondestructive test. (Right) Basic materials are also tested to design strength and beyond; they go into production a thoroughly known quantity.

Torture, look and listen

By this the finest material is selected . . . or developed

More than 260 full-time engineers and technicians utilizing a multi-million-dollar laboratory team up with the experienced design staff to give Westinghouse the foundation on which conscientious craftsmanship builds quality.

They set standards for basic materials and establish line checks by which standards are enforced. But more than that, they probe for new materials, new principles for solving design or procurement problems.

Thus, Westinghouse quality rests on a firm tripod: Top design engineering meets service requirements; materials engineering matches design demand; production faithfully meets the standards of both.

This facility of Westinghouse is unequaled in the industry. That's why it's right to say, "You can be *Sure*, if it's Westinghouse."

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING FOR **YOU!***

CP 1036

Pictured at luncheon are, left to right, Vic Hartley, PCEA managing director; Samuel Unitt, Southern California Gas; John T. Rickard, Santa Barbara mayor; George W. Smith, Southern Counties Gas; Gilbert Brighouse, Occidental College; John A. Talley, Calectric; George S. Coates, Southern Counties; T. T. Arden, PCGA president; B. C. Meith, Calectric, and R. D. Scott, PCGA managing director

Good Management for Accounting

"Effective Management Makes the Difference" was the conference theme that led members of the Pacific Coast Gas Assn. Accounting Section and the Pacific Coast Electrical Assn. Administrative Services Section through two days of close examination of themselves as people and of their business methods.

The joint meeting, held at the Santa Barbara Biltmore, Nov. 14-15, attracted about 160 people who participated in four parallel sessions devoted to Cost Reporting as a Tool of Management, Credits and Collections, Employee and Supervisory Relationships, and fourth, Purchasing.

Dr. Gilbert Brighouse, professor of industrial psychology at Occidental College, Los Angeles, first-day luncheon speaker, used the title "Is An Accountant Human?" to present his very candidly revealing analysis of the people generally found in the accounting profession. His views were carried into some of the formal discussions and to many of the informal, "nonprogrammed" conversations through the remainder of the meeting.

In this highly entertaining and informing talk, Dr. Brighouse raised three questions: (1) How do accountants appear to other people?; (2) Why do they appear that way?; (3) What can be done about it?

On the credit side of the answers to his first question, Dr. Brighouse said accountants are generally highly regarded for their technical abilities, honesty, conscientious endeavor, loyalty and stability. On the debit side, he said accountants usually appear to be cold, impassive and obnoxiously correct. Too often, he said, the debits are shown up as being more important than the credits because others are more sensitive to the less desirable characteristics.

Why do accountants appear the way they do? Dr. Brighouse explains that: (1) Others wish they had some of the same attributes and react with jealousy; (2) The organizational relationship of the accountant to fellow employees puts him in a "policeman's" position where he must say "yes" or "no" to employees not directly connected with his department; (3) The field of accounting is attractive to people who find organization, precedent and system are buffers separating them from other people . . . it attracts those who do not want intimate contact with others. New recruits are often selected for this ability, and as they are promoted into supervisory positions they carry the same characteristics with them into a position that requires an entirely different personal make-up.

What can be done? Dr. Brighouse suggests that accountants, particularly those in supervisory positions, should study themselves from the viewpoint of others. To do this, Dr. Brighouse said the individual should encourage a feedback of information from those about him. He must have a *real* desire to reach out and discover what someone else has on his mind. He said this ". . . is something that cannot be faked."

Another important corrective measure the individual can take is to form habits in communication that will make him more attractive while still accomplishing the necessary functions of the accounting supervisor. He said four messages must be carried in self-expression. The messages are: transmission of facts; explanatory (reasons for facts); self feelings on subject; and, finally, communicate a friendly feeling (in effect, say "I like you" in one way or another). To leave out any one of the four elements of good communication, according to Dr. Brighouse, greatly detracts from the quality of the relationship with the individual involved.

Dynamic Accounting

Serious consideration of applying the humanities to accounting services was provided by T. T. Arden, executive vice-president of Robertshaw-Fulton Controls Co., president of PCGA, and second luncheon speaker.

Arden said his company is using accounting in a way that improves employee relations and, therefore, directly improves production. Basically, the idea is to feed information to supervisors as quickly as possible so they can have and show the results of their efforts on the production side of the business.

Advantages of the "dynamic accounting" practice are obvious from the standpoint of production. If a new production practice is being tried, an early report on the value of it can help

determine whether it should be continued, modified or dropped.

Less obvious benefits of "dynamic accounting" are equally important, according to Arden. They are found in employee relations, where the men and women responsible for developing and implementing new production practices get a feeling of accomplishment and recognition by having the results of their work reported back to them from management on a timely schedule, even as often as weekly, if it is warranted by the particular business.

Accounting

H. D. Cunningham, Sponsor

The advent of machine accounting is bringing with it the advantage of allowing management and supervisors to receive quick, accurate and highly informative reports from throughout a utility company, and the Responsibility Accounting section of the meeting proved to be an idea exchange on how to produce the reports and what they should contain.

Successful application of the reporting generally is based on five rules.

1. Cost responsibility should be assigned clearly and logically to one person in a department, function or other cost center.
2. Actual costs should be measured against standards that represent high level but attainable performance.
3. Actual cost and output data should be complete and accurate.
4. Performance reports should be simple and prompt.
5. Organized follow-up should assure positive corrective action.

Some opinions coincided with that of T. T. Arden—that the basic value of the reporting lies in carrying information back to the supervisory level quickly and accurately so cost controls can be applied as soon as possible by the people closest to the cost function. Too often the reports go only one direction—to management—and filter back to the cost center in the complex form of a "break-down" for lower levels that does not provide the people directly concerned with performance standards for their particular elements of the actual costs. The cost control system should be built from the ground up, with information from it feeding back to the source of the cost as it is accumulated.

All phases of responsibility accounting, under the topic heading of "Establishing, measuring and reporting attainable and actual costs to provide a tool for better management," were discussed.

Leaders and participants in the section were: P. B. Sharrott, Southern California Edison; John Byrne, Grayson Controls Division of Robertshaw-Fulton, and R. C. Witter, H. D. Cunningham, J. R. Leman, R. E. Strand, A. D. Petersen, R. H. Watson, and R. F. Robb, all of Southern Counties Gas.

Collections

Samuel Unitt, Sponsor

Two things outstanding about the collection section meetings were the close attention to costs of collection and an awareness of the customer relations factor in collecting.

In the process of gearing collection activities to the times, utility companies seem to be directing stricter attention to the cost of collection, because money in general is hard to get and cost dollars are therefore more important. There is an apparent trend away from collecting bills merely because the company is entitled to the money. The amount has to justify the expense of certain collection methods.

Also a sign of the times is the sensitivity of collectors to the public relations factor and the customer's habits of payment. In this period of general high installment credit, the customer's budget is often controlled by the installments he is paying, and the collector fits his demands on the income accordingly. An effort is being made to create the impression that the utility is a reasonable and tolerant creditor who expects his money.

Reducing the cost of collection is a perennial problem and one that was given much attention by those participating. Electronic data processing, properly applied, is providing some savings and, as a by-product, some tools for use by the collection department.

Some techniques that appeal to the customer's pride, fairness and self-interest were discussed. Included in these is application for service by telephone, elimination of the cash deposit except in selected cases, reasonable and fair collection follow-up on delinquent accounts, redepositing "not-sufficient-funds" checks to save customer embarrassment in case a deposit was made to cover the check after it was written and, finally, courteous collection reminders that include an offer to help the customer with the payment problem if it is necessary.

The many facets of collection were

Purchasers and suppliers got together for this after-session period of relaxation and bull session. Left to right, as faces appear in the picture, are Frank Dickey, Anaconda; Vic Hartley, PCEA; Hal LaFortune, Sacramento Municipal Utility District; Walter Sterling, Arizona Public Service Co.; Harry Edwards, Hubbard & Co.; Al Tracy, Anaconda, and Stan Sherman, Reliable Electric. Manufacturers were represented at the second day sessions of the purchasing delegates and much discussion of buyer-supplier relationships was brought out. The point of contact for suppliers, in most cases of actual purchasing, is the purchasing department buyer. For engineering service or introduction of new equipment, purchasers recommended vendor contact with department and report the contact to the purchasing department in full detail

discussed and interpreted by: W. E. Haskell, Southern California Gas Co.; Elwood C. Paddock, Pacific Gas and Electric Co.; D. A. Yeary, Southern Counties Gas Co.; E. B. Kruger, Southern California Edison; E. J. Wright, San Diego Gas & Electric; and Leon S. Heseman, California Electric Power Co.

Employee Relations

B. C. Meith, Sponsor

In discussing employee and supervisory relationships in the accounting department, delegates began the sessions by admitting that there is a problem in most accounting departments when promotions carry characteristics of the good accountant into supervisory work. With the problem brought out in the open, the delegates then exchanged the methods, theories and results of supervisory training that have shown possibilities toward correcting the problem.

Most of the solutions to the supervisory problem—the problem of converting an accountant to an accounting department supervisor—seemed to be similar in most respects to the ideas of Dr. Brighouse summarized earlier in this report. Analysis led the group through defining the qualifications of a good supervisor, the leadership needs from the standpoint of the employee, communications between the employee and the supervisor and the ideal results of good supervision as a contributor to employee relations.

Summarizing this section meeting, which consisted of excellent papers and lively, earnest discussion is difficult to accomplish and do justice to the meeting. The fact that the problems are recognized and progressive improvement is under way in many companies is the highlight.

Discussion leaders of the sessions were: Stanley Green, Southern California Gas; L. W. Crosby, Southern California Edison; Robert E. Parsley, San Diego Gas & Electric; Richard E. Dake, Southern Counties Gas; and L. F. Kopp, Pacific Gas and Electric.

Purchasing

J. T. Montague, Sponsor

Delegates to the purchasing section discussed the many problems associated with being a department that conducts both a service and a profit-making activity. Out of the discussion came pointed interest in a reported practice of rotating buyers' duties, responsibilities and accountability which has had the effect of strengthening and increasing the flexibility and efficiency of a purchasing department under actual application.

Jack Montague, Ray Benton and Phil Schaefer do an after-session recapitulation

In all the problems discussed, from purchasing through ordering and transportation of the needed goods, the two items (service and profit making) were considered integral parts of all purchasing department activities.

Another practice, which tends to separate service functions from the "profit-making" activities of buyers is decentralized ordering. The system is designed to relieve the purchasing department of purchasing routine supplies. It is accomplished by delegating limited authority to substore ordering offices.

Designated as an ordering guide procedure, the practice allows substore ordering offices to process and place purchase orders direct on vendors through the medium of ordering instruction sheets. The instruction sheets carry all data necessary to prepare the purchase order. Substore ordering offices make direct purchases of only those items normally carried in substore stock, in most cases. The procedure takes place under full jurisdiction of the purchasing department, with a buyer setting up the instruction sheet and making the initial negotiations with vendors.

Purchasers also considered the matter of traffic management, which is either a separate department or a function of the purchasing department devoted to finding the most economical and reliable means of transporting goods purchased to the utility delivery point at the time it is needed.

Because of the many means of transportation, routes, delivery schedules and other factors, transportation is a field that offers an opportunity for worth-while money savings. To quote one paper: "Every company pays for good traffic management. Those companies which do not have it pay the most."

Generally speaking, the most desirable practice is for utilities to control the transport of goods purchased in order to realize what savings are available from good traffic management. Terms of the sale (purchase) can affect the right to route shipments, which makes the procedure of shipping a matter of interest to both purchasing and traffic. Selection of the carrier, route and the point where the utility takes title to the goods all have money saving possibilities in taxes, rates or delivery dates.

Discussion leaders for the purchasing sessions were: Leslie Jantz, California Electric Power; R. E. Taylor, Southern California Gas; R. P. Benton, Pacific Gas and Electric; Robert B. Marlatt, Southern California Edison; and J. P. Schaefer, Pacific Gas and Electric.

New officers of the joint meetings are Co-Chairmen George S. Coates, Southern Counties Gas, and John A. Talley, California Electric Power; and Vice-Chairman W. N. Fairlee, Pacific Gas and Electric Co.

Bath Iron Works' crane loads reel from flatcar to barge.

Cable laying

LOCAL NEWSPAPERS seldom get excited over the laying of a submarine cable. But when Central Maine Power Company announced plans to link the island of Islesboro with a new 12,000-volt underwater cable, newspapers throughout the state covered the event.

The new cable, three inches in diameter and 2.3 miles long, was made in one length with no splices permitted. The cable, reel and cradle weighed *63 tons*, and in the whole area north of Boston there was only

CMP officials check final armoring of cable at mill.

71-year-old "Seguin" stands by ready to help.

CMP crew boards launch during the pre-dawn hours.

makes headlines in Maine

one water-front crane (owned by Bath Iron Works) big enough to load the reel onto its barge. Even the tugboat was newsworthy; it was the venerable "Seguin," one of the oldest tugs on the coast, built in Bath 71 years ago.

The actual cable laying was directed by Al Young, CMP's Eastern Division line superintendent. Under radio control, the barge started off at daybreak to lay the cable in the 220-foot-deep (maximum) water. The laying took only three hours, and the barge reached the far shore at high tide (as calculated), so it could get close to the shore.

The Tiger Brand cable was made up of three No. 2 conductors covered with conducting fabric tape, 21/64 inch of marine rubber insulation, color-coded fabric conducting tape again, then a tinned copper tape that furnishes additional shielding and also protects against the toredo or "ship worm." Saturated jute fillers and a binder of rubber-filled tape complete the core.

Two layers of asphalt-saturated jute are spirally applied in opposite directions, followed by the all-important No. 6 galvanized steel armor wires. A final asphalt coating is applied, then a layer of chalk to prevent sticking.

• • •

If you'd like more information about submarine or any other kind of high quality Tiger Brand cable, just call your American Steel & Wire salesman.

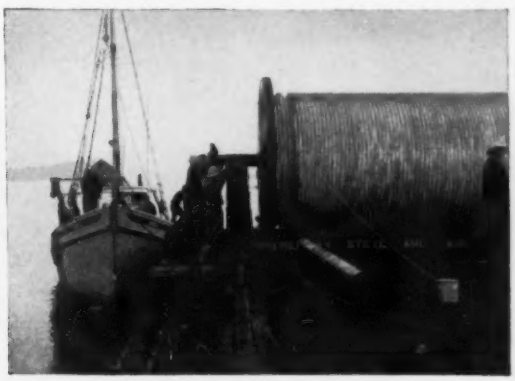
AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS TIGER BRAND ELECTRICAL WIRE & CABLE

A STANDARD TIGER BRAND CABLE FOR EVERY SPECIAL JOB

- asbestos wire and cable
- mold cured portable cord
- shovel & dredge cable
- paper & lead cable
- varnished cambric cable
- interlocked armor cable
- special purpose wire & cable
- aerial, underground and submarine cable

UNITED STATES STEEL



Trawler maneuvers barge with reel into position.

End of the line. Cable is trenched, potheads are on pole.

NELPA reviews history as it appoints

New Executive Manager

Alden F. Krieg, Portland's junior first citizen for 1953, became the new executive manager of the Northwest Electric Light & Power Assn. and successor to Berkeley Snow on Nov. 15. His selection by the officers of the association came after a long screening by a special committee headed by Thomas Delzell, Portland General Electric Co. board chairman, and was announced by E. M. Naughton, Utah Power & Light Co., president of NELPA. Snow retired after 29 years of service, Dec. 1.

The association, which was 48 years old at the Gearhart convention this fall, has had a colorful existence, weathering two wars and one major and several minor depressions. Snow points out that in his 29 years experience the association fortunes dipped sharply from the heyday of the late 20s to the depths of the depression of the 30s.

On the folding up of the NELA in 1933, the association had 350 members in all classes, today it has 1,250. It was able to continue functioning without NELA support as it had never given up its autonomy when it operated as NELA's Northwest geographic division.

During World War II, the association was the originator and the rallying point for the "War-time Mutual Assistance Program," which listed spare equipment and manpower among the private and public operating utilities in the area to be pooled for emergency in case of enemy attack. Many services for government regulatory bodies functioning during those troublous war days were performed by the association.

With the postwar conversion to peacetime economy, the association functions have shifted to put emphasis on keeping pace with rapidly increasing industrial development and population growth enjoyed in the region.

Alden Krieg, commenting on taking over the managership, said: "The thought of working with the fine group of people making up the membership of this dynamic association is a pleasant one. There seems much to be done, and the prospect of helping direct the operations of such an organization constitutes a real challenge.

"I find the association in healthy condition. It has a large and active membership and a substantial reserve of working capital. It enjoys the good will of the electrical industry in the area and has many enthusiastic supporters.

"I realize there is much to learn about the personnel and operations of the utility companies in the area and of the electrical manufacturers, distributors, manufacturers' agents, contractors and dealers that are associated with us. I expect to travel the territory, visit with our members and other friends in the industry, and become better acquainted with these operations. At present we plan no changes here in staff or in activities. Plans for section meetings are well advanced and we look forward to a year of substantial accomplishment."

Krieg

Has Active Career

A graduate of Oregon State College, 1947, in electrical engineering and with courses to his credit in utility management, production and accounting, Alden Krieg, who is 32, worked from 1948 to 1954 with Portland General Electric as commercial sales engineer and was responsible for formulating Portland's $10,000,000 street lighting program. On leave of absence in 1954 he became executive secretary of the exposition-recreation commission of that city, which position he left to become the NELPA executive manager.

Among electrical organizations he has been a member of NELPA, of the Electric Club of Oregon and the Illuminating Engineering Society as well as active in many civic and state organizations.

New officers for the 1956-1957 year were installed by all Illuminating Engineering Society sections and chapters last month and old officers honored. At the Golden Gate Section, Harold Wright, past chairman, was given certificate of appreciation by John Walsh, IES director. Seated are C. W. Macy, section vice-chairman, and Guy de Leuze, chairman

for DOUBLE SHEATH PROTECTION use Okolite-Okoprene control cables

The W. B. Tuttle Plant of the City Public Service Board, San Antonio, Texas.

A modern plant—in appearance and engineering—the W. B. Tuttle Plant of the City Public Service Board of San Antonio, Texas is the city's newest installation. Okolite-Okoprene control cables are used throughout the plant to control the 66,000kw output.

Okolite-Okoprene multi-conductor control cables give *double* protection. First, each conductor is given complete terminal-to-terminal protection by its own Okoprene sheath. Second, additional protection is provided by an Okoprene sheath over the entire cable assembly. Okoprene is highly resistant to moisture, acids, alkalies, and heat. It is nonflammable and will not be corona-cut if ozone is developed by adjacent equipment. Thus, each conductor in Okolite-Okoprene multi-conductor control cables is protected twice against these dangers. This double sheath protection guarantees long cable life and reliable, round-the-clock circuit security.

For complete details on Okolite-Okoprene control cables, write for Okonite's Bulletin WE-1056-A. The Okonite Company, Passaic, New Jersey.

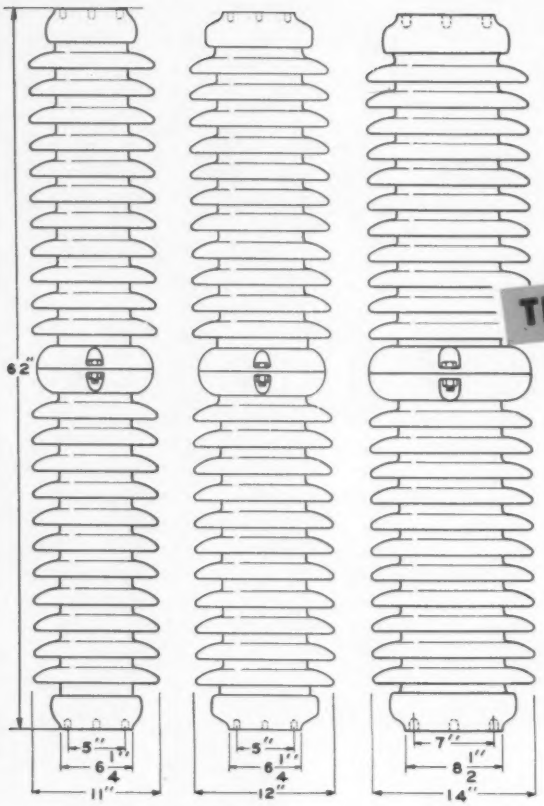
A multi-conductor, color-coded Okolite-Okoprene control cable.

Available with either copper or aluminum conductors

OKONITE OKONITE SINCE 1878 ***insulated cables***

2709

NOW 161 kv Station



51161 52161 53161

THE NEW LAPP DESIGN THAT'S MORE SECURE

Planning new station construction at 161 kv? Here's help to greater design flexibility . . . construction economy . . . and operating efficiency.

CHOICE OF STRENGTHS

Select the 1,200-lb. Standard Lapp Station Post, 1,700-lb. High-Strength, or 3,500-lb. Extra-High Strength unit on the basis of current and spacing requirements. In each strength rating, the Lapp Station Post unit meets NEMA and BIL values, and provides *extras* in convenience, economy and reliability.

EASIER, FASTER TO INSTALL

Two 31-inch-high units comprise each of these Lapp units . . . only one bolted connection is required for field assembly (as compared with four connections required to assemble the four stacking units and sub-base of the conventional pin-cap station insulator for this voltage).

The smaller over-all diameter of these units provides for greater flexibility in use, as well as reduced space requirements for storage and transportation.

Lighter weight, too, makes for easier handling; the new Lapp units weigh approximately 30% less than conventional units.

LAPP POSTS ARE STIFFER

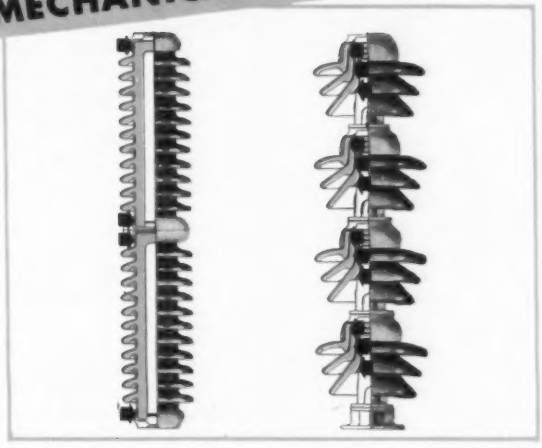
Deflection under cantilever load results from "take-up" in bolted and cemented joints, and by flexing of metal parts. The Lapp Station Posts at 161 kv consist of two porcelain post sections, each with caps externally attached at the ends. This is a total of only *four* cemented joints, all of large-area low-intensity compression loading. This compares with the *twelve* cemented joints of the conventional 161 kv station insulator, each subjecting the assembly to relatively small-area, high-intensity tension loading.

Catalog Number	51161	52161	53161
Voltage Rating, kv	161	161	161
Cantilever Strength, lbs.	1,200	1,700	3,500
Tension Strength, lbs.	20,000	25,000	40,000
Torsion Strength, inch-lbs.	40,000	90,000	120,000
Compression Strength, lbs.	60,000	75,000	100,000
60-cycle Dry FO, kv	485	485	485
60-cycle Wet FO, kv	380	380	380
Impulse Flashover, kv Pos.	810	810	810
Impulse Flashover, kv Neg.	1020	1020	1020
60-cycle Withstand, kv Dry	385	385	385
60-cycle Withstand, kv Wet	315	315	315
Impulse Withstand, kv	750	750	750
Test Voltage, Radio Infl.	103	103	103
Maximum RIV, Microvolts	500	500	500
Leakage Distance, in.	132	132	132
Dry Arcing Distance, in.	51	51	51
Net Weight, lbs.	240	285	430

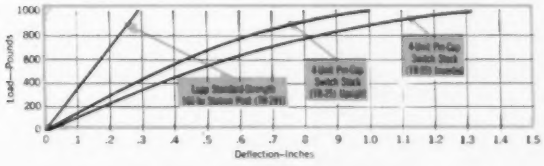
Posts in 3 Strength Ratings

EASIER TO INSTALL . . . EASIER TO MAINTAIN . . .

MECHANICALLY AND ELECTRICALLY



A comparison of rigidity characteristics of the two designs is shown in the deflection curves, as derived from laboratory measurement. The greater rigidity of the Lapp Post design provides an evident advantage in improved alignment between switch blade and contact—and in more positive switch operation. (The Lapp Posts preserve the advantage of stiffness at any mounting angle; for horizontal or inverted mounting applications, the superiority in rigidity is even more marked.)



MORE EFFECTIVE INSULATION

A higher ratio of porcelain-to-metal than in previous 161 kv designs results in increased flashover distance and more of the insulator height as effective insulation.

Lapp Fog-type design is the basic concept of all Lapp Posts. For service in contaminated atmosphere, its uniform leakage path, without narrow shielded hot-spots, reduces leakage flashover, and makes the insulator "self-cleaning" in wind and rain.

NO CRACKING . . . NO PUNCTURE

As in all Lapp Posts, the insulating value comes from porcelain posts, without internal metal components or nested parts. Porcelain is loaded only in compression, so avoids bursting tension forces. Puncture does not occur because external air path is as short as internal puncture path. Nor does corona form to create radio interference.

STURDY UNDER FLASHOVER OR IMPACT

Leakage surface is achieved by multiple short petticoats, which in addition provide an exceptional protection to the insulator body under arcover or mechanical attack. Under extreme conditions, the petticoats themselves break off, leaving the post body intact, with only negligible loss of flashover or leakage value.

MODERN HIGH-VOLTAGE INSULATION

For 25 years, Lapp Station Posts have led the way to improved station performance and reliability. For the more exacting demands of the higher voltages being required on your system today, and in the future, Lapp Posts will provide an even greater margin of operating security.

Lapp Insulator Co., Inc., Le Roy, N. Y.

Lapp

Sam W. Mesick, Los Angeles Wholesale Electric Co., was elected NAED Western region vice-president at the recent Phoenix convention. He is shown here at the mike. Seated is W. B. Meek, Wesco, Los Angeles, who was regional vice-president last year

Contractors Study Housepower Program

A plan to develop new business for electrical contractors through the Housepower program gained the rapt attention and provoked many questions from the more than 200 contractors, distributors, manufacturers' representatives, bankers, FHA and VA officials and utility company officers and employees who attended the annual dinner meeting, Electrical Contractors Division, Bureau of Home Appliances of San Diego County, Oct. 30, in Balboa Park San Diego.

R. Crawford Logan, administrator for the Housepower program in Phoenix, was the speaker. He described how a home rewiring, preselling program operates. The plan originally started in Kansas City, where he operated it, and is now being conducted in Phoenix under Logan's direction, as a cooperative program of Arizona Public Service Co., Salt River Power District, Electrical Joint Industry Board of the NECA and IBEW of Arizona, and the Appliance Merchandisers Assn. Points of special interest made by Logan were that the public is willing to pay for adequate wiring in order to live better electrically, that rewiring can be profitably sold at cost plus 40%, and that the best selling can be done right at the scene, that is, at the location of the existing inadequate circuit breaker panel or service entrance and in the room served by octopus outlets.

At the head table were F. L. Byrum, chairman; R. J. Phillips, vice-president in charge of sales, San Diego Gas & Electric Co.; E. C. Phillips, program chairman; Shelby Wiggins, manager, local NECA chapter; Chuck Bratton, vice-president, local NECA; Ed Nystrom, president, Bureau of Home Appliances; Willard Woolfolk, coordinator of vocational training, San Diego city schools; J. C. Chamberlain, secretary-manager, Bureau of Home Appliances; Alan J. McCutcheon Jr.; R. Crawford Logan; and Norman Foster.

The evening's program was developed around the "Housepower" theme. Alan J. McCutcheon Jr., acting coordinator, Electrical Contractors Division, first reported on the past year's activities of which local participation in the national Housepower contest, Certified Lighting schools, and the Division's "X-Ray House" at the Spring Fair of Modern Home Ideas were highlights.

Norman Foster, account executive, Barnes-Chase Advertising Agency, then reviewed the advertising and sales promotion program of the division. Foster also acted as moderator for a manufacturers' panel composed of Jerre Blair, General Electric Lamp Division; Ed Peterson, Trade Winds Motorfans; M. R. Gregory, Shalda Mfg. Co.; Lee Krauss, Square D Co.; Barney Rosson, Marvin Mfg. Co.; and Bill Rivers, General Electric Construction Materials Division; which discussed how the Housepower theme was being incorporated into company sales programs.

The election of the following roster of new executive committee members was announced: Neville Baker of Escondido, chairman; Ward Howard, vice-chairman; Mason Baity, Fred L. Byrum, Walter F. Chapman, F. X. Delano, Norman Ferguson, George Meese, Tom Murphy, Al Myers, E. C. Phillips, William Powell, R. T. Redfield, and Ralph Rohrbach.

• **Speaking before the AIEE at Vancouver,** Miles Green, chief engineer of the North West Telephone Co., described the section of the Trans Canada microwave system to be completed in the spring of 1958. It will give Canada a transcontinental television hook-up and improved long distance telephone facilities.

1957 Association Meetings Scheduled

February

14-15—**Electrical Inspectors Assn. of B. C.,** annual convention, Vancouver, B. C.

28-March 1—**Pacific Coast Electrical Assn., Business Development Section,** Sheraton-Palace Hotel, San Francisco

March

15—**Intermountain Electrical Assn.,** annual conference, Salt Lake City

18-20—**Northwest Electric Light & Power Assn., Business Development Section,** Empress Hotel, Victoria

21-22—**PCEA, Engineering and Operating Section,** Statler Hotel, Los Angeles

28-29—**Illuminating Engineering Society,** Northwest regional conference, Hotel Empress, Victoria

April

3-5—**IES,** Pacific Southwest regional conference, Statler Hotel, Los Angeles

11-12—**IES,** Intermountain regional conference, Hilton Hotel, Albuquerque

24-25—**PCEA, Administrative Services Section,** La Playa Hotel, Carmel

24-26—**NELPA, Engineering and Operating Section and Personnel and Safety,** Sun Valley

May

15-17—**PCEA,** annual convention, Fairmont Hotel, San Francisco

20-22—**National Electrical Contractors Assn.,** combined Districts 6, 8 and 9 annual conference, Multnomah Hotel, Portland

June

20-22—**NELPA, Accounting and Business Practice Section,** Sun Valley

August

28-30—**American Institute of Electrical Engineers,** Pacific general meeting, Yakima

September

9-11—**International Association of Electrical Inspectors, Northwestern Section,** Davenport Hotel, Spokane

November

4-6—**IAEI, Southwestern Section,** Phoenix

7-8—**PCEA, Hawaii Section,** Reef Hotel, Honolulu

PCEA Guidance Committees Report

Because it was necessary for J. F. Sinnott of the San Diego Gas & Electric Co. to resign as chairman of the Engineering and Operating Section of the Pacific Coast Electrical Assn., Karl M. Bausch of Bechtel Corp. has been advanced from vice-chairman to chairman. J. H. Drake of Southern California Edison Co. has been appointed vice-chairman.

The Guidance Committee of the Engineering and Operating Section met recently and set up the program for a conference to be held at the Hotel Statler in Los Angeles, March 21-22. Joint sessions of various discussion groups were scheduled as follows:

1. Overhead transmission and distribution group and the underground transmission and distribution group to discuss "Advantages Accruing from Cooperative Planning by Subdividers, Planning Directors and Utilities."

2. Overhead transmission and distribution group, substation group and engineering design group to discuss "The Effect of 40 Mva and Larger Distribution Substations on the Design of Primary Distribution Feeders."

3. Overhead transmission and distribution group and transportation group to discuss "Practice of Utilities in Pulling (tension stringing) and Reconductoring of Highlines."

4. Substation and underground groups to discuss "Methods of Installing Cables in Substations and Problems Encountered."

5. Communications group and system operations group meeting in joint session for a round-table discussion relative to improving the reliability of microwave.

6. System operations group, steam generation group, hydro generation group and engineering design group to discuss "Recent Developments in Automatic Dispatching Systems."

The conference will open Thursday (March 21) with a general assembly (speakers and subjects still unassigned) and will close Friday afternoon with a general assembly featuring a discussion on the use of business machines in solving engineering problems. There also will be luncheon programs each day.

Sponsors are now at work planning programs for the periods when the groups will not be participating in joint sessions.

Extremely active and ambitious programs were reported by committee chairman and vice-chairmen when the Guidance Committee of the Business Development Section met in Los Angeles Nov. 2. Detailed reports of the committee's activities will be heard when the Business Development Section convenes at the Sheraton-Palace Hotel in San Francisco, Feb. 28-March 1.

The committees involved include agricultural electrification, commercial-industrial wiring, residential wiring, commercial-industrial lighting, residential lighting, kitchen and laundry, home economics, power utilization and heat and air conditioning.

The home economics committee will sponsor a breakfast for all conference delegates, with Miss Helen Kirkland, consultant on women's interest in the "Live Better . . . Electrically" program, as speaker. One of the conference luncheons will feature a talk on California's water problem by J. J. Deuel, director of the Public Utilities Department of the California Farm Bureau Federation.

Hawaiian Workshops

Hilo Electric Light Co. was host to PCEA's Hawaiian Section for informal workshop sessions at the Volcano House.

Meeting under R. R. Lyons, vice-president and general manager of Maui Electric Co., the Administrative Services group heard a discussion of new developments and trends in the Hawaiian labor picture by Dwight C. Steele, president of the Hawaii Employers Council, and a talk by E. A. Helbush, Heco, on estimating the average service life of utility depreciable property. The section also heard reports of the land subcommittee and results of a survey of residential customers on the Island of Maui.

The Business Development group, chairmanned by George A. Rinker, manager of W. A. Ramsay Co., discussed means of promoting better wiring and lighting at its morning session. Speakers were Charles H. McAllister, Heco, commercial engineer; Daniel F. Flinn, American Factors, chairman of the lighting committee; and Stanley J. Skuk, Heco lighting consultant. In the afternoon the group heard Erma Meeks Boyen, Heco, tell why a home economics service is essential to the electrical industry. C. R. Pope, Holst & Cummings & Myers, told the value of advertising and promotion in the industry. In the final session the Electrical Living Committee presented its report, led by John M. Jorgensen, Von Hamm-Young, chairman.

• **Olde Timers Day** at the Los Angeles Electric Club brought out both old and young to see old lighting equipment, heaters, washers, irons, etc., and to hear Sheriff Eugene Biscailuz. A picture gallery of projects of an earlier day were familiar to "Olde Timers" and interesting to the "Young Feller."

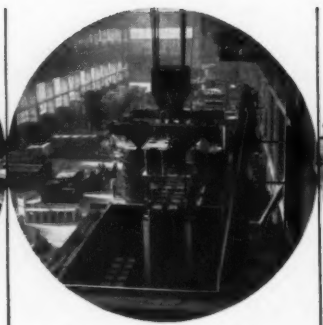
• **Grounding** industrial power systems was a subject recently discussed by L. G. Levoy before AIEE members at a meeting in San Francisco.

Nearing completion is the Job Management course presented through the cooperation of the Oakland School Department of Vocational Education with the Northern California Chapter, NECA, at Merritt High School Tuesday nights for 30 weeks to an enrollment of about 36 contractors and superintendents or general foremen from the Bay area. Dex Jewett, NECA field representative for District 9, with Instructor Henry Tilson, above, was one of many speakers experienced in labor relations and personnel management who addressed the classes and discussed questions from the class at each session

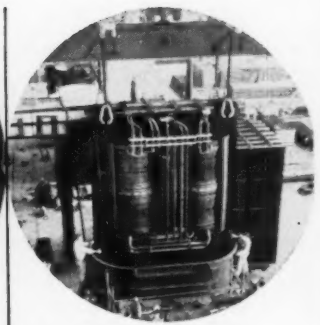
THE PATTERN . . .

Engineering research augments experience and know-how to make today's product better . . . tomorrow's nearer.

Design experience transfers the thought to plan for product.



Facilities, the finest in the industry, are necessary to produce today's high Kva Moloney Transformers.



Superior production methods assure step-by-step assembly of transformers to meet utility specifications.

True! The only thing you can be sure of is change.

Utility thinking . . . planning . . . needs . . . have changed to meet increasing consumer demands. So, too, it is change at Moloney to keep pace with utility progress. Here, the best transformer today is routine . . . and the best transformer of tomorrow the goal. By research . . . by development . . . and just plain dissatisfaction, we are working to change things for the better.

See us . . . about today's transformer problems . . . tomorrow's . . . or just *because.* Our help is yours . . . just for the asking.

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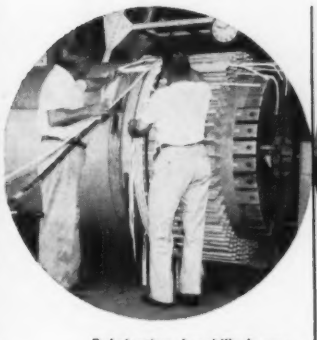
MOLONEY ELECTRIC

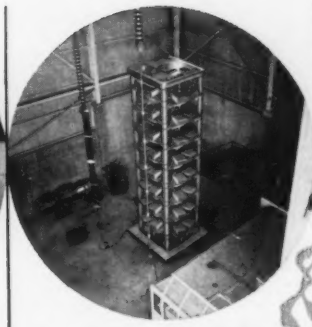
Power Transformers • Distribution Transformers • Load Tap Changing
Step Voltage Regulators • Primary Unit Substations • Secondary Unit Substation Transformers
Subway Transformers • Industrial Dry Type Transformers • Capacitors

SALES OFFICES IN ALL PRINCIPAL CITIES • FACTORIES AT ST. LOUIS

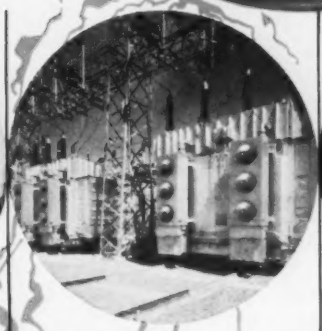
IS CHANGE



Fabrication, by skilled, experienced workmen, transposes engineering and design know-how into product.



Testing, unsurpassed in the industry, pre-proves performance as specified.



Installed and operating . . . as you planned . . . as you specified.

MOLONEY ELECTRIC

The Sign of Quality . . .
All Along the Line.

C O M P A N Y

Transformers • Regulating Transformers

Network Trans- formers • Series Street Lighting Transformers

Transformers and Inductors for Electronics

20, MIS SOURI, AND TORONTO, ONTARIO, CANADA

THIS MONTH'S NEWS

President T. E. Roach of Idaho Power Co. told these stockholders that growth of the Snake River Valley area during the next 10 years will require another 1,000,000 kw of new power, capacity, and expenditures of $260,000,000 for power plants and distribution facilities. "The most exciting thing about the past 40 years of Idaho Power Co. progress, Roach said, "is that there is no end to it. On the contrary, it accelerates from year to year and I can predict... the economy of the Snake River Valley has a bright future"

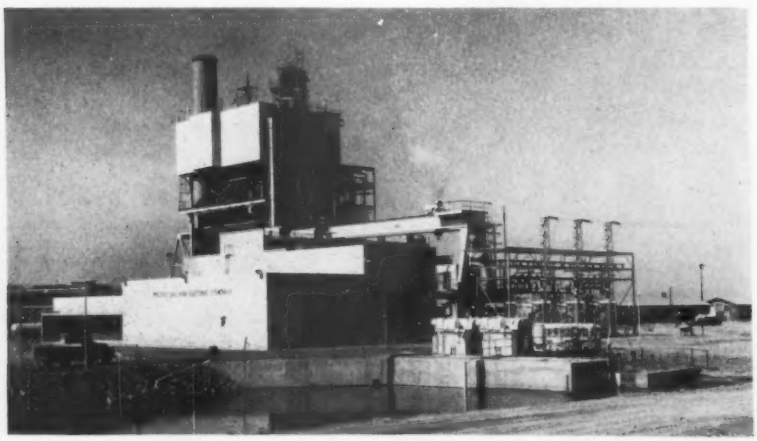
Snake River Diverted For Brownlee Project

With completion of a 2,540-ft-long diversion tunnel at Idaho Power's Brownlee Dam, the Snake River has been diverted from its normal channel and pumps are at work drying out the dam site for excavation to solid foundation.

More than seven months of drilling and blasting prefaced the turning of the river into the tunnel.

Idaho Power and the contractor report total expenditures on Brownlee and Oxbow have exceeded $10,000,000 to date.

Morrison-Knudsen said the Brownlee pay roll would reach 1,100 men this spring and, in preparation for the influx, construction will turn to a school system for children of the workers. Two schoolhouses already are in operation, one at a trailer camp just below the Brownlee site on the Oregon side of the river, and one at Oxbow village.



Pacific Gas and Electric Co. dedicated its new $16,500,000 Humboldt Bay power plant in October. The first of two 50,000-kw generating units went on the line. The second, now under construction, is scheduled for completion in 1958. The plant is located near Eureka on the northern California coast. It is the company's 14th steam generating plant

Engineers Have Plan For Snake Development

Army engineers have proposed an alternate plan for developing the Snake River near Lewiston, to save money by reducing from three to two the number of locks required to provide navigation upstream to mile 172.

The plan, presented at a joint meeting of the city councils of Lewiston and Clarkston, Wash., will be discussed at public hearings before the Army engineers recommend which plan should be approved. The plan was outlined for the councilmen by Col. Myron E. Page Jr., Walla Walla district engineer.

The alternate proposal would save approximately $90,000,000 by eliminating a navigating lock at the proposed Clarkston Dam. The total cost

Hundreds of visitors, including Los Angeles city councilmen, newspaper people and other San Fernando Valley civic, business and industrial leaders attended a special preview and open house at new Valley District commercial office of Department of Water & Power. Auditorium contains an electric kitchen. The building replaces two offices and is the San Fernando Valley commercial headquarters

of the alternate plan is about $370,000,000.

There are five major changes from previous proposals:

1. Raise the height of Lower Granite Dam at river mile 113.1 from 82 to 102 ft to maintain a constant slackwater level at Lewiston. The level would be a constant 735 ft rather than fluctuating from 715 to 735 ft.

2. Eliminate the proposed dam at Clarkston.

3. Relocate the proposed Asotin Dam approximately four miles upstream at river mile 146.8, rather than the earlier site, mile 151. This is about five miles upstream from Clarkston near the Asotin grain elevator.

4. Relocate the proposed China Gardens Dam upstream at river mile 172.5, rather than mile 176. The new site would lie five miles above the confluence of the Snake and the Grand Ronde River.

5. Increase the heights of China Gardens Dam, from 90 to 107.5 ft, and Asotin Dam from 100 to 107.5 ft. These increases would provide a 215-ft rise in the river upstream to the Mountain Sheep dam site.

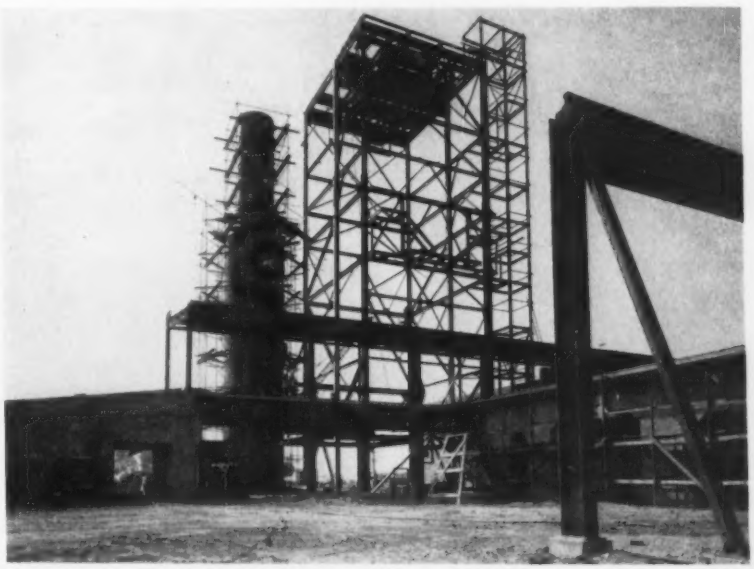
Legislature Will Make Water Plan Decisions

The immediate fate of California's water development program will be in the hands of the next session of the state legislature, which will be asked to make decisions on half a dozen major water problems, including appropriations for the huge Feather River project and approval of the California Water Plan.

First action should be an urgency appropriation to expedite actual construction of the Feather River project, according to Harvey O. Banks, Director of the Department of Water Resources. The $1.5 billion program envisages transporting surplus northern California water into water deficient areas as far south as the Mexican border. Key units would be a huge dam and 440,000-kw power plant on the Feather River near Oroville.

Speaking to the fall conference of the California Section of the American Water Works Assn. at San Diego, Banks said California faces crippling water shortages. The state spent nine years and some $8,000,000 studying the problem and in evolving the California Water Plan, which the legislature will be asked to sanction as the master plan for state-wide coordinated water development.

• **Cheyenne,** Wyo., which is said to be the first city to light its streets with electricity, is converting its old-style street lights to mercury vapor. The city has signed a 10-year contract with Cheyenne Light, Fuel & Power Co. for installation and operation of 163 units.



Under construction is the first of four 60,000-kw steam electric generating units at the San Bernardino plant of California Electric Power Co. This unit, designed, engineered and being constructed by Fluor Corp., is scheduled for completion next June. The design incorporates a reheat boiler to supply steam to turbine at a pressure of 1,800 psig

Sen. Arthur Watkins talks to President Eisenhower over public address system and telephone to set off blast shown at the right

Glen Canyon Started

Twin explosions recently brought to life a new era of reclamation and power projects in the West. Almost simultaneously blasts shook loose the cliff walls of Glen Canyon, near the Utah-Arizona border, and Flaming Gorge, just inside the Utah-Wyoming line.

President Eisenhower touched a telegraph key in Washington, D. C., and blasts at the two dam sites marked the initial construction of the Upper Colorado River Storage Project.

Brief ceremonies at each dam site were attended by federal, state and local officials and members of the nation's news services. E. O. Larsen, regional director, Bureau of Reclamation, who is directing the Upper Basin Project; Senator Arthur V. Watkins (R-Utah); Rep. William R. Dawson (R-Utah); L. F. Wylie, project engineer for Glen Canyon; George D. Clyde, Utah's commissioner for interstate streams and Republican candidate for governor of Utah; J. R. Bingham, representing the Utah Water & Power Board and others were gathered on the west side of the river at Glen Canyon.

On the east side colorful Navajo Indians mingled with spectators from northern and central Arizona and a throng of press and newsreel photographers who had vantage points on the lip of the gorge.

The Glen Canyon blast started work on the diversion tunnel that will carry the waters of the river through a 2,768-ft bore 45 ft in diameter while the 700-ft-high dam is under construction. The job will take six years.

At Flaming Gorge, the blast stripped the cover from a portion of the left dam abutment in connection with core drilling operations to seek a solid foundation for the dam.

Just prior to the blast, the President and Secretary of the Interior Fred A. Seaton talked by telephone with Senator Watkins.

"Within my sight, an engineer is waiting to press the plunger which will set off the explosion on your signal," Senator Watkins said during the White House telephone conversation. "We are now ready, Mr. President, for you to start the work on this great project."

President Eisenhower then said, "All right, Arthur, this is a pleasure. Here we go. The work ought to be already started."

Harry Sanderson touched off TNT charge

The President pressed a golden telegraph key and with that signal the blasts were set off. It tore loose some 500 tons of red sandstone, leaving a great scar down the face of the sheer cliff.

"As all of you heard," said Senator Watkins, "that was a huge explosion. Work on this project now has officially commenced."

Glen Canyon Dam, termed the key structure in the Upper Colorado River Storage Project, will be the largest of four main-stream storage units authorized for construction as part of the project. The others are the Flaming Gorge Dam, the Navajo Dam on the San Juan River in New Mexico, and the Curecanti unit on the Gunnison River in Colorado.

Glen Canyon Dam, which will rise 700 ft above the normal level of the Colorado River, will be the second highest dam in the United States. Only Hoover Dam will be higher.

The reservoir created by the dam will extend 186 miles up the Colorado River, nearly to the mouth of Green River. Storage water also will be backed 71 miles up San Juan River, a principal tributary entering the Colorado River from the east. The surface area of the dam will be about 240 square miles.

A single power house will be built at Glen Canyon Dam. This one power plant will produce nearly half of the hydroelectric generation planned for the entire Colorado River Storage Project.

Construction of the main structure of the dam will probably be completed in six years. The total estimated cost of the dam and related facilities is $421,000,000.

Congratulations!

. . . to the American Telephone & Telegraph Company upon the completion of the new Transatlantic cable linking Europe and America.

This engineering achievement, the result of cooperative American and British enterprise, signalizes a new era of greatly improved Transatlantic telephone service.

Simplex Wire & Cable Co., as manufacturer and supplier of the American-made part of the submarine cable used in this gigantic project, is understandably proud to have participated in this historic accomplishment, and in the development work which made it possible. **SIMPLEX WIRE & CABLE CO.,** 79 Sidney Street, Cambridge 39, Mass.

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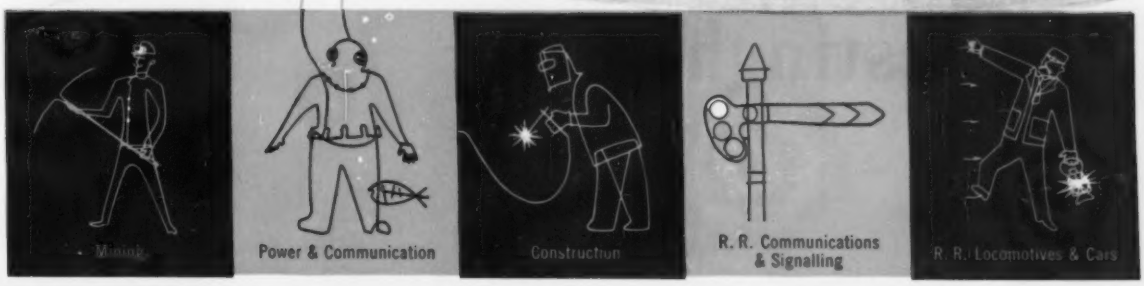
Wires and Cables for:



Utilities can save up to 75% in soundproofing

with new Westinghouse power transformers

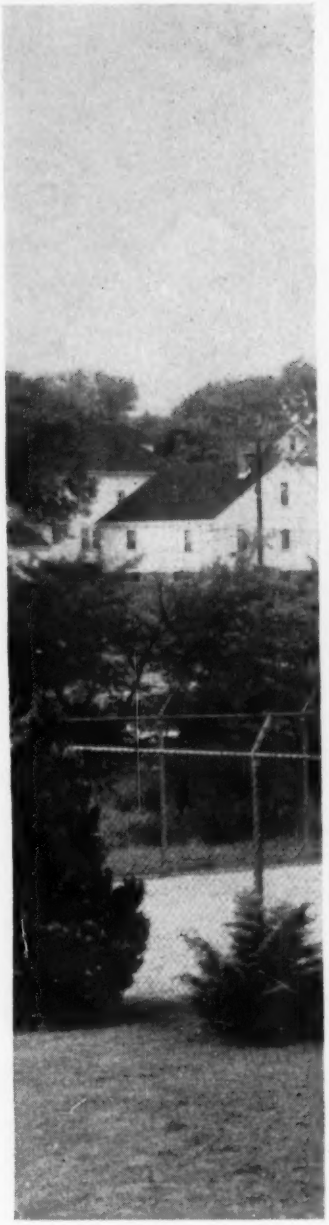
Westinghouse announces drastic reduction in premium costs paid for transformers with lower than standard sound levels. Extensive improvements in manufacture and application of materials have created spectacular new performance available to all users of Westinghouse power transformers. Noise levels can now be reduced for much less cost.

Westinghouse power transformers—already smaller and lighter per kva than transformers of any other design or manufacture—will achieve lower sound levels and promise to show even greater advantage in weight and size comparisons. Here is new performance available for all new purchases of Westinghouse transformers—501 kva up to the world's highest capacity three-phase units.

So here's new help—especially in planning substations where increasing population densities are making transformer noise a real problem. This is welcome news, too, for noise-sensitive areas such as schools and hospitals. In addition to investment savings and improved public relations, consider the advantages of new flexibility in interchange of equipment, and new ease in obtaining rights of way and substation sites.

Anticipated power transformer purchases over the next five years total 300,000,000 kva. Based on this figure, reduction in soundproofing "extras" can reach $30,000,000. This is the performance Westinghouse can deliver—with all new power transformers.

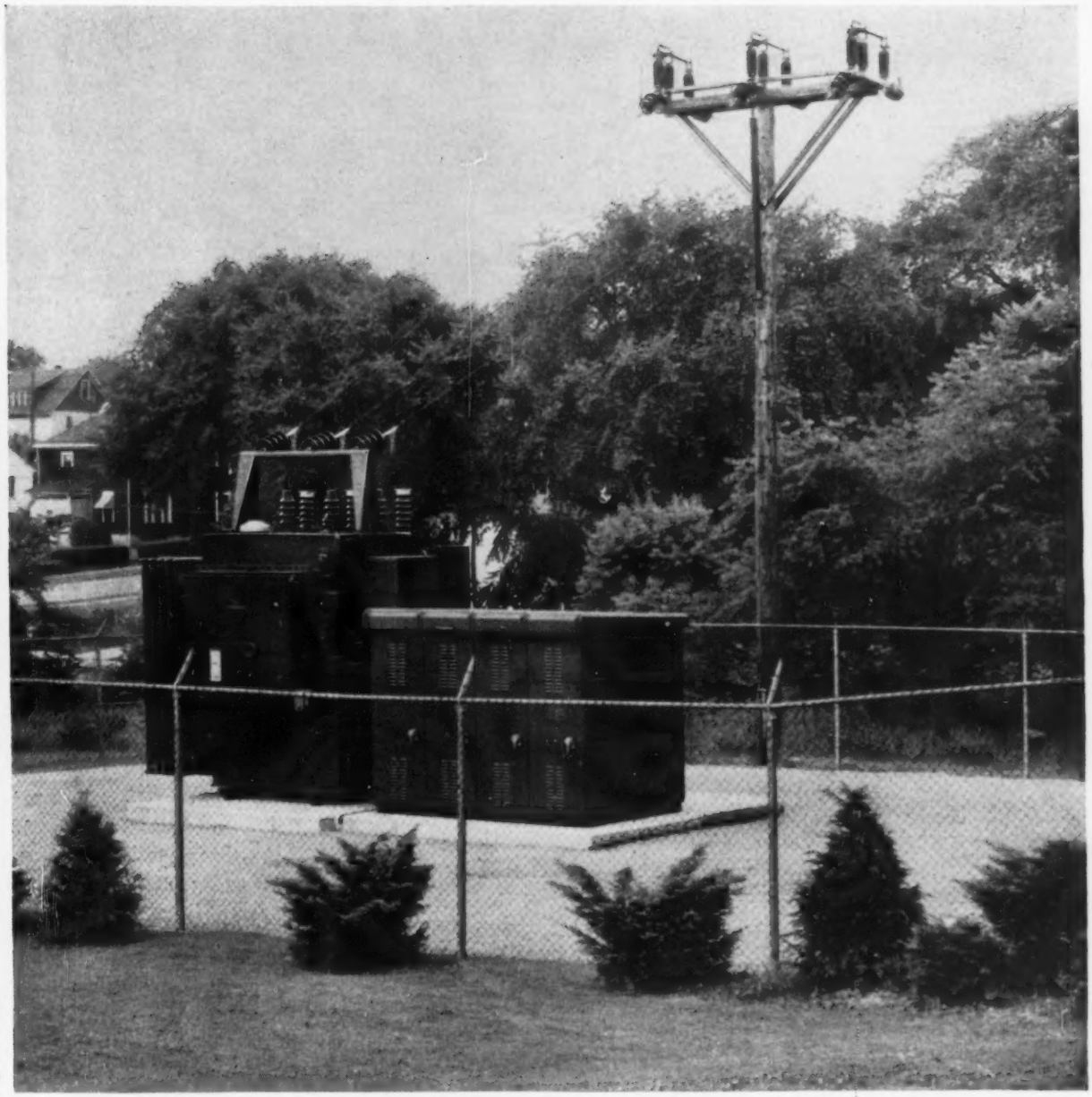
For the full story, call your Westinghouse representative or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-70785



Westinghouse now offers you a $11,730 saving on equipment ordinarily invested to cut transformer noise at a typical 10,000 kva neighborhood substation such as this . . . a saving equal to 25% of total equipment cost.

YOU CAN BE SURE...IF IT'S

Westinghouse®



RECOMMENDED NEMA SOUND LEVEL DB.	PER CENT PRICE ADDITIONS FOR REDUCTION IN RECOMMENDED NEMA SOUND LEVEL OF									
	3 DB.		6 DB.		9 DB.		12 DB.		15 DB.	
	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW
56 to 60	22	6	41	9	—	—	—	—	—	—
61 to 65	14	5	25	7	55	14	—	—	—	—
66 to 70	8	4	15	5	35	10	—	—	—	—
71 to 75	4.5	3	9	4	20	7	35	14	—	—
76 to 80	2.5	2	5.5	3	11	5	19	10	39	20
81 to 85	2	1	3.5	2	6	3	12	6	23	12
86 to 95	—	1	—	1	—	2	—	4	—	8

Drastic reductions in sound levels offered with all new Westinghouse Transformers make possible the above reduction in premiums previously necessary to achieve these same levels.

First Application In For Glen Canyon Power

Nevada's first application for a share of electric power from the Glen Canyon Dam on the Arizona-Utah border has been filed by Sen. Alan Bible for the Pahrump-Ash Meadows Improvement Assn. with the Colorado River Commission and the Interior Department.

The request asks that the southern Nevada organization of farmers, cotton growers and businessmen be allocated 21,099.954 kwh of power annually from Nevada's share. Eventual organization of a Pahrump power district is planned.

Bible, who has led Nevada's fight for a share of Glen Canyon power, secured a commitment in authorizing legislation passed by Congress this year that Nevada and other lower Colorado River basin states would receive "equality of treatment" in allocation of dam power. Originally, upper basin states had sought all the power.

Grand Coulee Can Have More Generating Units

A third power house at Grand Coulee Dam is feasible now from an engineering standpoint and will become economically feasible when up-stream projects become a reality, the Washington State Reclamation Assn. at Yakima was told by H. T. Nelson of Boise, regional director of the U. S. Bureau of Reclamation.

Studies have been made for plants containing four to 12 units, each rated at 108,000 kw, the same as in the existing plant, Nelson said. Cost estimates range from $76,000,000 for a four-unit plant to $118,000,000 for an eight-unit plant.

PG and E Applies for Atomic Project Permit

Pacific Gas and Electric Co. has filed an application with the California Public Utilities Commission to install a generator and related equipment scheduled to start producing the nation's first all-privately-financed nuclear-electric power next year.

The 5,000-kw unit will obtain its steam from a nuclear fueled, boiling water-type reactor now being built by General Electric Co. at the Vallecitos Atomic Laboratory near Pleasanton, Calif. PG and E and General Electric are cooperating in the project.

The power plant will be operated by General Electric and PG and E to provide their engineers and atomic experts with experience in advance of building the 180,000-kw Dresden nuclear plant near Chicago and others planned for completion in 1960 and thereafter. The big plant will be built for Commonwealth Edison Co. of Illinois by General Electric under an arrangement with Nuclear Power Group Inc., in which PG and E is associated.

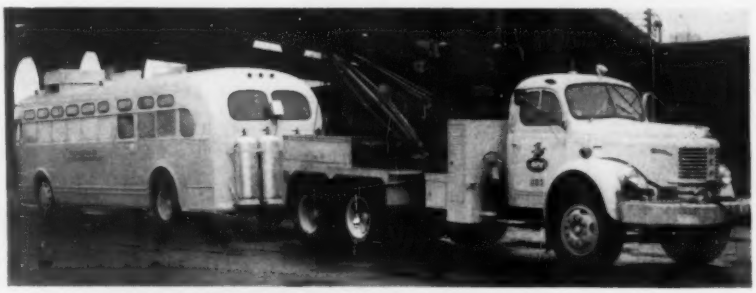
Mine Problem Solution Announced by Seattle

Proposing to build a $140,000,000, 540,000-kw hydroelectric dam on the Pend Oreille River near the Canadian border in northeast Washington State, City Light of Seattle has elaborated on plans previously revealed for preventing damage to mining properties in the reservoir area.

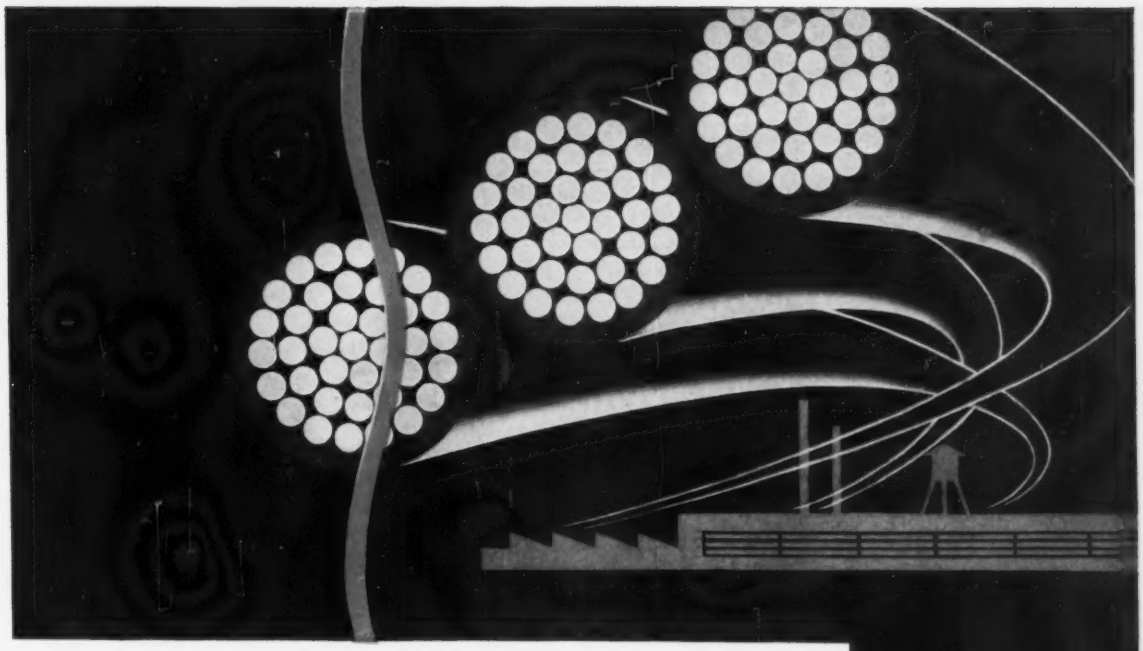
The plan calls for the drilling of a 7x10-ft tunnel on each side of the river, 100 ft below its bed, and directly below the sides of the reservoir. Initially, these tunnels would be about two miles long, opposite present mine workings some six miles above the dam. If mining operations continue northward toward the dam site, City Light pledges itself to extend the tunnels, keeping them 3,000 ft ahead of the mine workings. Cost of the initial work is estimated at $4,330,000; of the extension to the dam site, $17,600,000.

The tunnels are designed to find and seal off any faults that might prevent loss of water from the reservoir into ore bodies, and as part of a permanent drainage system for mines of the area.

Mining interests have been kept informed of the proposed dam and City Light hopes they will think enough of it so they will not lodge a protest against the proposed dam with the Federal Power Commission. A main obstacle to the dam is the necessity of providing protection for mines.



British Columbia Electric Co. reports time savings for maintenance crews on the Bridge River transmission line by using two retired buses for housing and feeding. Top photo shows bus being towed to the job and bottom picture shows the kitchen and dining area. A "sleeper" bus has a bathroom and bunks and carries tents for remainder of the crew



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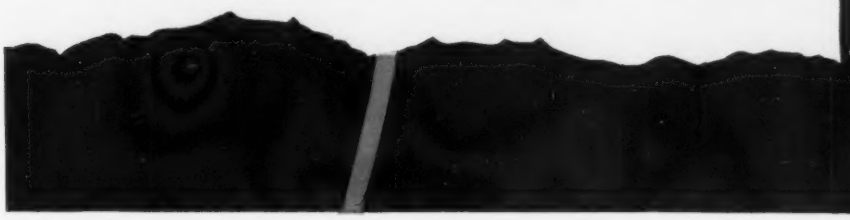

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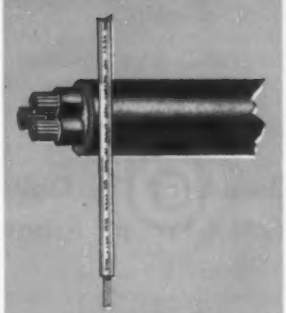

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Power Authority Drops Plans for Steam Plant

Plans for a state-owned steam plant have been abandoned by the Arizona Power Authority.

The sidetracking calls for a new look at plans for development of Colorado River power, instead.

The proposed 30,000-kw plant had touched off a hot battle between public and private power interests.

Action for recommending the change of plan came from K. S. Wingfield, power authority administrator, who advised the commission the authority will be able to fulfill its need for kilowatt-hours during the interim under its existing contract with Arizona Public Service Co.

Wingfield also indicated a new study of the Colorado River should be made. He said it might indicate the advisability of building several smaller dams instead of two large ones—Bridge Canyon and Marble Canyon as advocated by the Bureau of Reclamation.

Seattle Receives Offer On Boundary Partnership

The Pend Oreille County PUD of Newport, Wash., has notified Seattle City Light of its willingness to participate in the municipal utility's construction of the proposed $140,000,000 Boundary hydroelectric dam on the Pend Oreille River.

The PUD operates Box Canyon Dam on the same river and sells part of its power to Seattle City Light, via transmission lines of the Bonneville Power Administration.

Exact form of the Boundary participation remains to be worked out. It may take the form of part ownership or a contract for purchase of some of the power.

Closure at The Dalles Marks Project Progress

Columbia River waters have been diverted through the skeleton structure of eight power-house units at The Dalles project, and closure is completed of the rock-fill dam link between the power house and the Oregon shore.

Corps of Engineers plans call for raising the dike 5 ft above river flow, according to the construction engineer in the Portland district office. This will put the rock-fill section at elevation 85 ft. River elevation is presently about 78 ft. The closure dam later will be raised to 185 ft.

Preliminary Report Done for Upper Lewis

The Cowlitz County PUD has received preliminary engineering reports on two hydroelectric projects proposed for the upper Lewis River, each with a potential power output of more than 100,000 kw.

The reports were prepared by Bechtel Corp., engineer for Pacific Power & Light Co. of Portland, Ore., with which the PUD may share in the two projects.

One development would be at Eagle Cliff, creating a reservoir extending several miles up the Lewis and Muddy Rivers and involving diversion of Pine Creek. It is approximately 10 miles upstream from the Swift Creek site currently being developed by the two utilities. Cost of the Muddy project has been estimated at $28,000,000.

The other project, known as the Meadows, would involve several diversion dams, penstocks and power houses on a network of small tributaries east and south of the Muddy site.

Bids and Contracts

• **Tinling & Powell** and **RT&E Co.**, Waukesha, Wis., were low bidders to supply a year's supply of transformers to Douglas County PUD. The bidding procedure is reported to have saved the PUD at least 10%.

• **J. A. Jones Construction Co.** and **Charles H. Tompkins Co.** will build the Swift hydroelectric project dam of Pacific Power & Light Co. for $18,272,000. The dam will be the highest earthfill river barrier in the world.

• **Fluor Maintenance Inc.**, a subsidiary of the Fluor Corp., has an Atomics International contract to install the reactor portion and regulated systems and do construction work on the Organic Moderated Reactor Experiment at the AEC's National Reactor Test Station in Idaho. The contract amounts to about $400,000.

• **Montgomery Electric Co.**, Portland, has made the apparent low bid of $351,506 on a contract to construct a new electrical substation, a 132-kv transmission loop and extension of an existing substation at the National Reactor Testing Station.

• **An invitation** for bids on reconditioning the Bureau of Reclamation's Palisades-Goshen transmission line No. 1 will be issued next spring. Prospective bidders are invited to go over the route of the line before winter weather conditions make it impossible. Address inquiries to: Henry P. O'Donnell, United States Bureau of Reclamation, Palisades, Idaho.

• **Vancouver Pile Driving & Contracting Co.** and **Belmont Construction Co.** will be awarded a joint contract to construct a storage dam, diversion dam, canal and appurtenant works on the Quinsam River on Vancouver Island for British Columbia Power Commission. Contract is for $994,035.

• **Northern Construction Co.** and **J. W. Stewart Ltd.** will build a 2½-mile tunnel at the Bridge River hydroelectric project of British Columbia Electric Co. The contract is for $9,000,000.

• **Key Construction Co.**, Tacoma, will construct the Chief Joseph-Covington 345-kv transmission line of Bonneville Power Administration for $208,729. Contract is for the Sultan-Covington section of line No. 1.

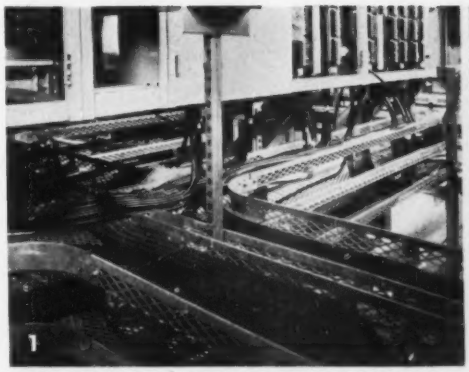
• **Miller Fuel Co.**, Kalispell, has received a Bonneville contract to build a substation maintenance building for $9,407. The building is at Kalispell substation.

• **Northern Idaho Construction Co.** has received an $87,194 Bonneville contract for construction of the 22.8-mile Burke-Royal 115-kv transmission line.

• **Sverdrup & Parcel**, San Francisco, has been selected architect-engineer for a new $5,000,000 permanent facility to house the Livermore, Calif., branch of Sandia Corp. Sandia is a nonprofit subsidiary of Western Electric and a prime contractor for the Atomic Energy Commission.

• **Morrison & Knudsen Corp.** has the Pacific Gas and Electric Co. contract for foundation work at Hunters Point steam plant. The work is part of extensive expansion of the plant.

• **Fegles Construction Co.**, Minneapolis, submitted the low bid for construction of $2,336,000 for work on the Fort Peck Dam on the Missouri River in Montana. The U. S. Corps of Engineers estimate was $3,021,292. Output of the generating facilities will be increased 60,000 kw when the project is complete.



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NEWS ABOUT PEOPLE

Joe Thompson Honored On 50th Anniversary

Friends and business associates of Joseph S. Thompson gathered in the Terrace Room of San Francisco's Fairmont Hotel Oct. 23 to acknowledge his 50th anniversary as president of Federal Pacific Electric (lower right).

The saga of Joe Thompson and the company he founded began in a three-man shop in a back yard in Napa, Calif., in the fall of 1906. Thompson borrowed $1,000 to start the switchgear business, and four partners invested $250 each. The corporation he heads now grosses more than $50,000,000 annually.

Louis Cole, founder of Cole Metal Products Co. and now chairman of the board of Federal Pacific, acted as master of ceremonies at the dinner. In the course of acknowledging Thompson's many years of service to the electrical industry, friends from Pacific Gas and Electric Co. presented the guest of honor an easy chair and Federal Pacific friends gave him a wrist watch and a color television set.

In the picture at the right, Thompson holds a 25-year-old air switch contact assembly that was a product of his company. The merits of the product are being explained to Leonard P. Shelley, left, Western regional manager, and E. F. Sixtus, vice-president.

Since founding the company, Thompson has guided it through many years of "firsts" and tremendous progress.

Puget Power Announces Six Personnel Changes

Several appointments have been announced by Puget Sound Power & Light Co. at Seattle.

Joe M. Phillips, formerly chief clerk at Seattle, now is division office manager of the southern division with headquarters at Olympia. He replaces Fred Anderson, retired.

New Seattle chief clerk is William F. Heidergott, who is succeeded as assistant chief clerk by Bob Laughlin.

F. Ray Johnston has been promoted to supervisor of printing and stationery to succeed the late Norris E. Lunde.

Three Are Promoted In PG and E Offices

Three promotions were recently announced by Pacific Gas and Electric Co.

Kenneth C. Porter, former manager of the Mission district, was promoted to assistant to the manager of the company's tax department. The Mission district managership was assumed by Milton E. Gross, who has been manager at Berkeley since August 1955.

A new district manager to replace Gross at Berkeley is Henry Lenninger, former Oakland district commercial manager.

District Managers Move In San Diego Promotions

San Diego Gas & Electric has had several changes in district manager assignments recently.

Kenneth M. Brown moves to the Chula Vista district to succeed George P. Winn, who is moving to the company's San Diego office.

P. H. Adams transfers to the Orange County district to take Brown's place, and Lemoyne Lambert moves from National City to take over the La Jolla managership vacated by Adams.

Lester Wright, district accountant at Chula Vista, is promoted to district manager and succeeds Lambert at National City.

• **Ernest L. Dungey,** former district commercial lighting consultant for Southern California Edison Co., is now in charge of the Houston, Tex., branch of Electro Silva-A-King Corp.

• **Chauncey Adams** has been appointed Spokane division manager of Washington Water Power Co. to succeed **George Brunzell,** who is assistant to the company president. Adams joined the company as a lineman in 1922 and progressed from there through several local managerships and a position as Hillyard branch manager.

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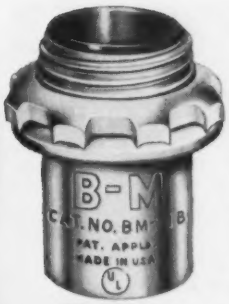
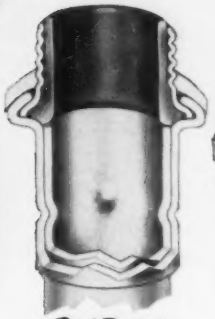
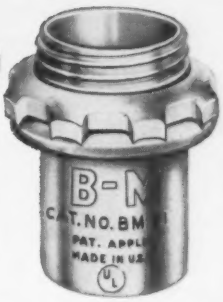


Red Throat
Insulated Connector



Red Throat
Cross section



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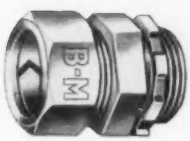
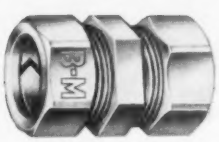


SIZES FROM
½" to 2"



SIZES FROM
½" to 2"

SIZES
½", ¾", 1"

SIZES
½", ¾", 1", 1¼"

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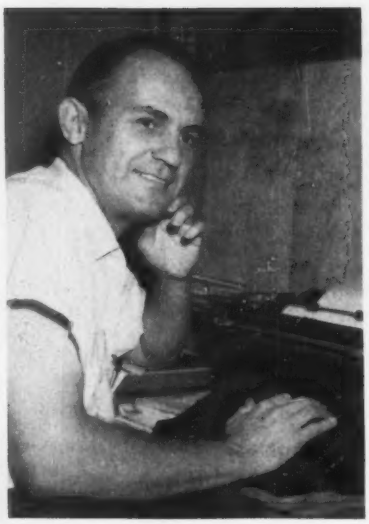


Unger

Salt River Scribe Wins Trout Award

Henry F. Unger, publicity supervisor for the Salt River Power District and associate editor of the Salt River Project's *Current News*, has received the Clement E. Trout Award for the best article of the year selected from among 500 industrial internal and external house magazines. The annual competition is sponsored by the Society of Associated Industrial Editors.

The article, which won the award for Unger and for the *Current News*, monthly employee magazine of the Salt River Project, appeared in the December 1955 issue and was called "The Man Behind the Mask," a story about Clyde Gordon, a Salt River Project employee handicapped by polio and yet an active baseball and softball umpire for the past 25 years. The article relates the handicapped employee's struggles and describes the courage of the offset pressman.

The *Current News* has been a three-times-in-a-row winner among house magazines in Arizona in the annual competition sponsored by the Phoenix Advertising Club. Editor is Mrs. Nina E. Duncan and art director is Virgil F. Hubert.

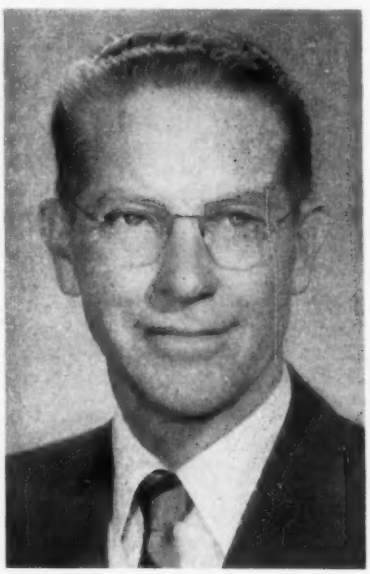
Unger is a member of the Phoenix Advertising Club, president of the Gila-Maricopa Counties Holy Name Union and regular contributor to many national magazines.

• **Dr. Abe Tilles,** well-known electrical engineer, returned to the San Francisco Bay area recently after two years as professor of electrical engineering at the Technion, the Israeli Institute of Technology at Haifa. Dr. Tilles taught in the electrical engineering department at the University of California for many years, and was later with the Pacific Gas and Electric Co. He is now engaged in consulting work with Robert E. Thomas & Associates, San Francisco.

• **Val Pabst,** pioneer Pacific Northwest hydrologist and member of the engineering staff of Tacoma City Light, has retired after 37 years with the utility. He is said to have made the first snow surveys in the Olympic Range in 1927 and continued the activity until the U.S. Geological Survey assumed the task in 1950.

• **Ralph J. Phillips,** vice-president in charge of sales of San Diego Gas & Electric Co., was elected president of the San Diego Chamber of Commerce for 1957. He has been a chamber director for six years and was vice-president in 1951 and 1953.

• **Herbert H. Hunt** is new assistant general superintendent of the operating department of Sacramento Municipal Utility District. His new position includes responsibility for the substation, underground and dispatching divisions.



De Voe

• **C. W. De Voe** has been appointed comptroller of San Diego Gas & Electric Co., to succeed **Arthur R. Cox,** who was elected vice-president and treasurer. De Voe has 35 years service with the company.

• **Robert S. Calland,** assistant regional director of the Bureau of Reclamation's Sacramento Region II, retired recently. His government service career totaled more than 33 years, and included work on the Boulder Canyon project and the Central Valley project in California.

Deaths

• **Henry C. Rice,** 67, former sales manager for Southern California Edison Co. and prominent member of Edison Electric Institute and the Pacific Coast Electrical Assn., died Oct. 21 at a Los Angeles hospital. Retirement ended 37 years of service with Edison on July 30, 1954. His distinguished service with PCEA over 32 years won for him a plaque of appreciation at the annual convention in Las Vegas last May. He had sponsored, and was original chairman of, the electrical living, television and air conditioning and room cooler committees of PCEA, and was a member of the guidance committee of the Business Development Section for 17 years. He was guidance committee chairman four years and vice-chairman four years. Two times during Mr. Rice's four years as sales manager, Edison was awarded the George A. Hughes award for outstanding electric kitchen promotion.

• **George H. Pike,** 63, a retired rate engineer for Washington Water Power Co., died recently following surgery in New York City. He was with WWP 25 years until his retirement in 1950, and had been working on special assignments for Ebasco Services when he became ill in Costa Rica. Before the Costa Rica duty he had represented Ebasco in Greece for many months.

• **Joe W. Erven,** 43, senior electrical engineer in charge of electrical design of power plants and receiving stations for Los Angeles Department of Water & Power, died Oct. 3 after a heart attack. During his career with the department, he had directed electrical design work on the Valley steam plant. He was a member of the AIEE and the Los Angeles Electric Club, and a graduate of the University of Southern California.

• **Gordon R. Shuck,** 74, professor emeritus of electrical engineering at the University of Washington, died Oct. 31 at Seattle. He was superintendent of a power and light company in Ketchikan, Alaska, before joining the faculty in 1918. Professor Shuck held patents on three electric meters.

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NOTES ON THE TRADE

• **William L. Friend** has been named Pacific Coast regional sales manager for the lighting division of Sylvania Electric Products Inc. Since 1947 he has served successively as field representative, district lighting sales manager in San Francisco and district lighting sales manager in Los Angeles.

• **Electric Cords & Supply** Co., Los Angeles, and its parent company, Royal Electric Co. Inc., have been purchased by International Telephone & Telegraph Corp.

• **M. A. Ellsworth,** vice-president and general manager of the engineering and construction division of Fluor Corp., has been elected a director.

• **Hugh Simpson** has been named superintendent of warehouses for the Salt River Power District to succeed **Robert Parks,** who retired. Simpson's former position as senior storekeeper at the 16th Street yard will be filled by **Harvey Watkins.**

• **Mark T. Anthony** has been appointed assistant to the vice-president and general manager of Kaiser Steel Corp.

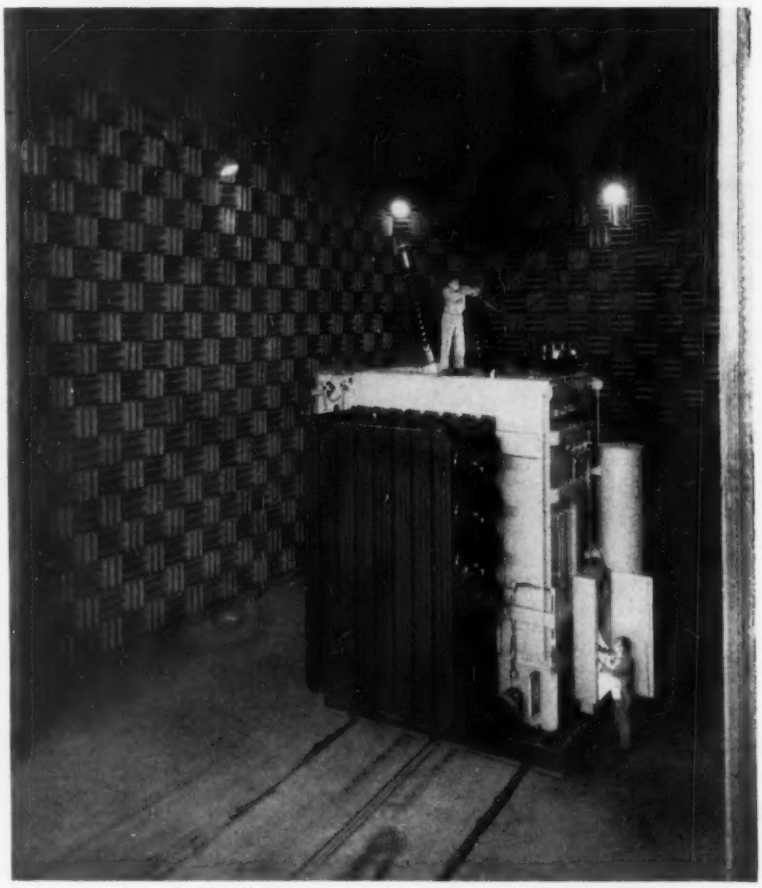
• **Winslow Park** has been named staff manager at the Westinghouse Sunnyvale, Calif., plant after a tour of duty in various eastern plants to study production methods under a variety of manufacturing conditions.

• **Motorola** Inc., Communications & Electronics Division, is expanding its West Coast headquarters and moving from San Mateo to a new building at Burlingame, Calif. The move more than doubles office space and the building will house the parts and service departments.

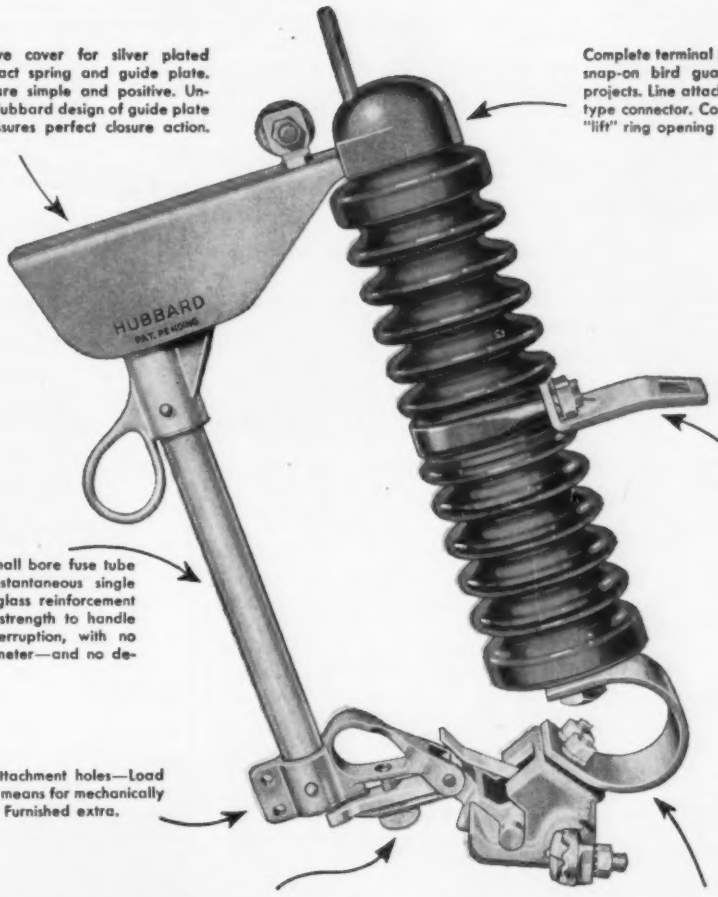
• **Graybar Electric** Co. announces the appointment of two new managers in the West. **R. J. Carlson** is new manager of the Phoenix operations and **B. F. Keyfauver** is new district sales manager of the Los Angeles district.

• **Square D** Co. has purchased three acres of land in Burnaby, B. C. The company is planning a plant to cost approximately $500,000, but no development will take place for a year or two.

These Sylvania executives attended the opening of a new warehouse and office building at Burlingame, Calif., recently. Standing are: C. A. Haines, vice-president and manager of facilities planning; Garlan Morse, lighting division sales manager, and Robert C. Harper, director of Pacific Coast sales. Seated is F. J. Healy, vice-president and director



Complete sound measurements on transformers rated more than 500,000 kva and weighing more than 400 tons can be made in Westinghouse's new anechoic vault at Sharon, Pa. Although commercial tests will be made here, research and development is main function



Sleet Hood, protective cover for silver plated phosphor bronze contact spring and guide plate. Closure and contact are simple and positive. Unaffected by weather. Hubbard design of guide plate and contact spring assures perfect closure action.

Complete terminal protection is provided by flexible snap-on bird guard through which a "lift" ring projects. Line attachment is by means of transformer type connector. Conductor may be snubbed through "lift" ring opening if desired.

New style, extra strong, insulated hanger. Coating provides bird and animal protection.

Specially designed small bore fuse tube for high pressure instantaneous single vent expulsion. Fibreglass reinforcement provides mechanical strength to handle maximum current interruption, with no increase in bore diameter—and no destructive results.

Load break fitting attachment holes—Load break fittings provide means for mechanically disrupting connection. Furnished extra.

Cam locking device which permits unobstructed removal of fuse holder when in the open position, in addition to locking holder against accidental removal the instant closure is begun. Spring actuated leverage arrangement puts tension on fuse link to aid in quick opening.

Locked recoil absorber bracket is provided to cushion recoil of discharge action. This prevents damage to the porcelain and mechanical assembly under stress of maximum current interruptions.

New Hubbard Distribution Fuse Cutout!

Now from Hubbard a new heavy-duty fuse cutout that opens a new era in the protection of equipment on your distribution lines. Incorporating new electrical and mechanical designs, the new Hubbard Cutout offers tremendous operational flexibility with its ability to clear faults over the entire operating range from minimum to maximum available fault current. No longer will it be necessary to continually check available fault current values at many different points as your system is expanded. What's more, the need for shifting cutouts to handle changing fault current values will be drastically reduced.

Heart of the new design is the small bore fibreglass reinforced, single vented fuse tube. By using a minimum inner diameter fuse tube and reinforcing it with fibreglass for maximum mechanical strength, Hubbard engineers were able to provide the positive expulsion action necessary for safe, sure, instantaneous arc interruption.

To support this greatly increased bursting action, entirely new high strength mechanical components were provided. There are no unnecessary or complicated parts in this new rugged simple design. Gas expulsion and fuse blowing are substantially completed before any parting of current carrying contacts. The entire current carrying circuit is composed of silver plated contacts of the pressure type. All springs are designed to act well below their elastic limits for maximum pressure maintenance throughout the life of the cutout. Positive closing is assured through the cam arrangement of the hinge mechanism which causes the fuse tube hinge to tighten as the fuse approaches the latched position.

Equipped with sleet, bird proofing and dead-end eye to meet local service conditions. Mechanical load break attachment can be specified as needed. Your Hubbard distributor will be glad to supply you with production samples. Call today, or write for a copy of Bulletin 756.

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• **Pacific Switchgear Division** of Federal Pacific Electric Co. announces the appointments of **Hoyt W. Jones** as purchasing agent and **Robert D. Byrne** as personnel manager.

• **Square D** Co. has just completed adding 10,000 sq ft of plant area to its Los Angeles facilities. The new space was designed for primary use for the assembly and calibration of circuit breaker equipment. It has 11 plastic molding machines and equipment for manufacture of bases and box covers for circuit breaker equipment. The new addition ups production potential of circuit breakers about 50%.

• **G. A. Palka** is in charge of a new Delta-Star Electric Division office at 542 S. Broadway, Room 402, Los Angeles 13. Delta-Star is a division of the H. K. Porter Co. Inc.

• **Edward L. Frumhoff** and **Norman A. Cohen,** electrical engineers, have created the firm of Frumhoff & Cohen, 7024 Melrose Ave, Los Angeles. The firm will provide electrical construction design services to architects and contractors in southern California.

• **Fluorescent Fixtures of California** has established a branch assembly plant at Vancouver, B. C. Vice-president in charge of sales of the new company is **Bill Adams** of the F. N. Adams Co. He will be assisted by **Rod McClellan** and **William Harrison,** and **John Alksne,** who is production manager.

• **Nat Blumberg** has been named vice-president in charge of West Coast operations of Lightolier Inc. His headquarters are at the company's Los Angeles office, 527 W. 7th St.

• **Philips Industries** Ltd., Toronto, is planning to open an office and warehouse in Vancouver, B. C. **O. W. Rodomar,** president, is doing the advance work.

• **Russell M. Smith** has started his own manufacturers' representative business under the name of Smith & Associates at 1301 6th St., Room O, San Francisco. He represents Tomic Sales & Engineering Co., Meiers Electric & Machine Co. and Standard Engineering & Mfg. Co., and will add other lines.

• **Hoffman Laboratories Inc.** is going to build a new electronic research and development center in the 3700 block on S. Grand Ave., Los Angeles. The two-story building will have nearly an acre of floor space.

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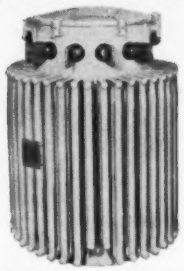

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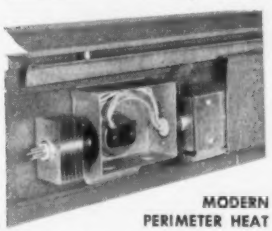

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Sheppard

• **Rex Sheppard** is now a sales engineer for the General Electric utility sales section of the Apparatus Division in Denver. He has been with G-E in various positions since graduation from the University of Colorado in 1951.

• **Richard L. Martin** is now in charge of sales of Webster Electric Co. sound equipment in southern California, Arizona, and Clark County, Nev. He will headquarter in Los Angeles.

• **Robert S. Bell** was elected president of Packard-Bell Electronics Corp. recently. He was formerly executive vice-president and general manager. **Herbert A. Bell**, founder of the company and president since 1945, was named chairman of the board of directors. "Electronics" is a new addition to the corporation name.

• **Robert R. Price** is Pacific Coast regional gearing division representative for Westinghouse Electric Corp. now. He succeeds **Arthur S. Davis**, who has been transferred to a new position at gearing division headquarters in Pittsburgh, Pa. Price will headquarter at 410 Bush St., San Francisco.

• **Hyde Sales** Co. has combined offices and warehouse at 1341 Cherokee St., Denver. The two operations were formerly at two different addresses. A new telephone number added to the company's listing is CHerry 4-7371.

• **M. W. Mount** is promoted to regional sales engineer for Electro-Motive Division of General Motors at Los Angeles. He will conduct sales engineering activities on the West Coast of mobile generating units for electric utility company use, and diesel-electric power systems for oil well drilling.

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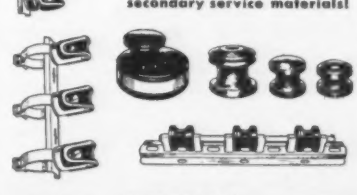

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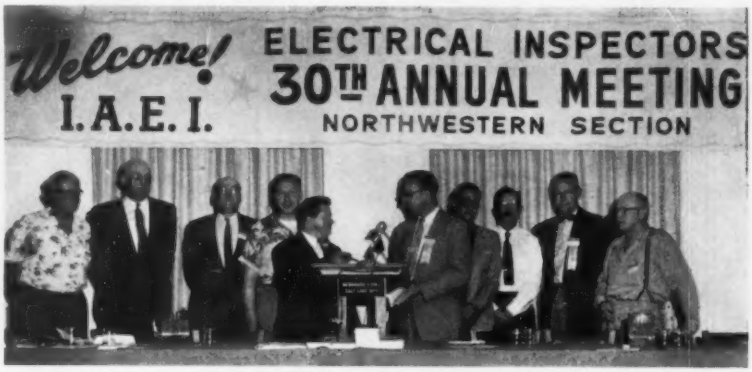
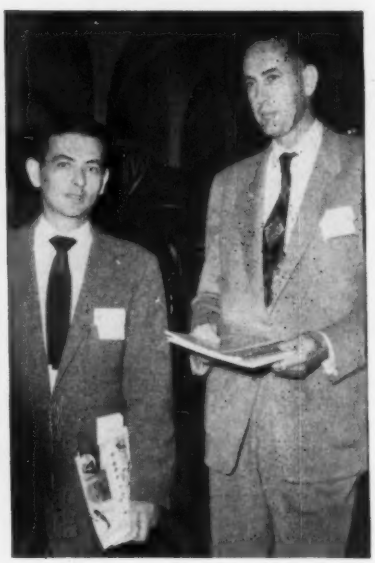


Officers of Northwest Section, IAEInspectors lined up for introductions—Bill Gaffney, Hyde Stayner, James Paxton, S. M. Tubbs, Cliff Atkins, the retiring president, Harold Morr, new president, P. H. Forte, J. R. Crawford, Tom Widrig and Joe Gray (see October issue, p 121). At left were the two international officers—Larry Trim, president of IAEI this year; Harold Morr, who will be next year both of his section and of IAEI. He is now first vice-president

Dr. Frederick E. Terman, provost and dean of engineering, Stanford University, right, receives the congratulations of M. S. Coover, president of AIEE, after Dr. Terman was given the first AIEE Member-for-Life Fund Medal. New medal will be awarded annually to an educator for exceptional teaching



Representing the young contractors at the NECA convention last month were San Franciscans David L. Stadtner of Sierra Electric Co. and Warren O. Smith, who is carrying on his late father's Smith Electric Co. and like him is an officer in the San Francisco Electrical Contractors Association

20 San Rafael-Richmond Bridges. Since World War II, Pacific Gas and Electric Company has invested twenty times the cost of the San Rafael-Richmond Bridge in new gas and electric facilities. That's $1½ billion! And it triples our capacity to serve Northern and Central California. We're still expanding, too.

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